DOCUMENT RESUME

ED 357 616 FL 021 165

AUTHOR Peyton, Joy Kreeft; And Others
TITLE Teaming with Text: Computer Networks To Develop Deaf Students' English Literacy.
INSTITUTION Gallaudet Univ., Washington, DC. Kendall Demonstration Elementary School.
PUB DATE 93
NOTE 147p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Computer Networks; *Deafness; Elementary Education; Elementary School Students; *English; Interaction; *Literacy; Program Descriptions; Program Implementation; *Written Language
IDENTIFIERS Clinite Center for the Hearing Impaired CA; *Electronic Networks for Interaction; Kendall Demonstration Elementary School DC

ABSTRACT

This report discusses the implementation of Electronic Networks for Interaction (ENFI) at Kendall Demonstration Elementary School at Gallaudet University in Washington, D.C., and William D. Clinite Center for the Hearing Impaired in Tulare, California. ENFI was developed to help improve deaf students' written English. The report will be useful to teachers and program administrators who desire to use computer networks and interactive writing to develop the English literacy of deaf students. Chapters include the following: "Introduction: The Concept Behind Teaming with Text" (Trent Batson, Linda Delk); "ENFI in the Classroom: What It Looks Like, How It Works, the Challenges It Poses" (Joy Kreft Peyton); "Project Goals and Methods" (Joy Kreft Peyton); "ENFI as Part of a Whole Language Program" (Martha French); "ENFI Activities at Kendall" (Joy Kreeft Peyton, Anne Marie Baer); "Factors that Can Influence the Quality of Network Discourse" (Joy Kreeft Peyton, Martha French); "Interactional Scaffolding in Network Conversations" (Joy Kreeft Peyton, Martha French); "Student Development" (Joy Kreeft Peyton with Heather Jilao, Leslie Brewer); "Institutionalizing ENFI at Kendall School" (Judy Lenard); "Implementing ENFI at Clinite" (Antonina Cardinalli); and "Disseminating ENFI beyond Kendall and Clinite" (Margaret Hallau). (VWL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED357616

TEAMING WITH TEXT

COMPUTER NETWORKS TO DEVELOP DEAF STUDENTS' ENGLISH LITERACY

Gallaudet University ENFI Project

Kendall Demonstration Elementary School

and

William D. Clinite Center for the Hearing Impaired

1990-1992

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Joy Peyton

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Joy Kreeft Peyton
Trent Batson
Judy Lenard
Martha French
Margaret Hallau
Linda Delk
Anne Marie Baer
Antonina Cardinalli

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

CG024165

1993

2

TEAMING WITH TEXT

COMPUTER NETWORKS TO DEVELOP DEAF STUDENTS' ENGLISH LITERACY

Gallaudet University ENFI Project

Kendall Demonstration Elementary School

and

William D. Clinite Center for the Hearing Impaired

1990-1992

Joy Kreeft Peyton
Trent Batson
Judy Lenard
Martha French
Margaret Hallau
Linda Delk
Anne Marie Baer
Antonina Cardinalli

1993

TEAMING WITH TEXT

COMPUTER NETWORKS TO DEVELOP

DEAF STUDENTS' ENGLISH LITERACY

REPORT SUMMARY

This report tells the story of the implementation of ENFI at Kendall Demonstration Elementary School at Gallaudet Universityin Washington, DC and William D. Clinite Center for the Hearing Impaired in Tulare, California.

ENFI (Electronic Networks for Interaction) had its beginnings at Gallaudet in 1985 when Trent Batson, Steve Lombardo, and HarryMarkowicz first used it with their college-level English classes. Since then, it has spread to schools across the country--for deaf and hearing students, from elementary school to college.

Students and their teacher sit in a class equipped with a local area computer network and, usually, one computer station for each student. Class members log onto the network with their own name or a pseudonym and begin to type messages to other class members. As messages are sent, they appear on all the other screens and scroll up the screen as other messages follow. Thus, class discussions can be conducted entirely in writing instead of orally or in sign language. The network will accomodate whole-class discussions, or can be set up for paired or small-group discussions, on separate channels. A verbatim printout of each discussion can be made at the end of the session. Class members can also display completed or in-process extended text on the screens of the rest of the class for discussion. Thus, students and teachers can watch each other brainstorm, compose, revise, and edit. It is a lively, collaborative environment where text is shared easily.

ENFI was developed to help improve deaf students' written English. The idea was that if deaf students were going to work effectively with extended texts--reading and writing books, essays, and other things--they needed to have experience seeing and using English like hearing people use it--in authentic interaction, for their own purposes, and with continuous feedback from others (both teachers and other students) on the effectiveness of their messages.

When Trent Batson, Joy Peyton, and a few Gallaudet teachers started using, studying, and talking about ENFI in 1985 and 1986, it was a very new idea. Most schools were not equipped with local area networks, and those that were, generally used them as a file server, to make one computer program available to all class members. Essayist text was considered to be very different from oral conversation, and there was little understanding of how

developing conversational skills could have a positive impact on "writing." Since then, a lot has changed. Computer networking, both local and over distance, has become commonplace, even in many school programs. We have undergone a mini revolution in our understanding of what is involved in producing a piece of writing and the role that conversation and social language play in writing development. So ENFI has caught on during the past eight years, along with many other educational innovations involving computer networks and written interaction.

In this project, we were interested in developing and testing ENFI activities for middle school deaf and hard-of-hearing students (ages 10-13). Some Kendall teachers had been using ENFI for a few years already, so we began the project with a small core of dedicated and experienced ENFI teachers. During the two years of this project, those teachers refined their practice, developed new activities, and mentored new teachers. We wanted to end the project with a strong group of teachers and a set of tested and clearly described activities.

When the project began, the principal at Clinite in Tulare, California had just set up a small network of five computers, and a teacher and classroom aide were ready to use it but had no experience. There, we were interested in finding out what issues a school just starting out with ENFI had to face, in terms of setup, maintenance, teacher preparation, classroom activities and processes, and student reactions.

This report is designed to help other places like Clinite. We expect it to be useful to teachers and program administrators who desire to use computer networks and interactive writing to develop the English literacy of deaf students. For teachers, the section on "ENFI Activities at Kendall" may be all they need. We provide a brief description of activities that Kendall teachers have developed and deemed successful, with a transcript actually produced by a class. Clinite staff also developed activities and wrote a teacher's guide with descriptions and transcripts. This is available from the Gallaudet ENFI Project upon request.

For administrators, the chapters on "Institutionalizing ENFI at Kendall" and "Implementing ENFI at Clinite" describe the victories and struggles of making ENFI a substantial part of the curriculum at a large elementary and middle school with considerable ENFI experience, and getting ENFI started at a small school with no previous experience.

Other chapters give an overview of the theoretical underpinnings of ENFI, show how ENFI works, situate ENFI activities within the whole language philosophy already in place at Kendall, and describe the classroom and conversational dynamics that might help or hinder effective practice. "Interactional Scaffolding in Network Conversations" describes the conversational dynamics evident in network conversations that have already been found to promote language acquisition by researchers studying child-adult oral interaction.

When we began the project, we thought we would be successful if students and teachers simply enjoyed reading and writing on the network (so many reading and writing activities have been difficult and painful for deaf students, for whom the sound-based grammar of English is largely inaccessible) and if we could come up with a few activities that seemed to work. We were not prepared for the impressive development we found in the students'

writing. In our detailed study of six students writing on the network, we found that at the end of a year these students:

- o felt more comfortable and confident with writing on the network (and perhaps in other contexts as well) and more motivated to do it than they did at the beginning of the year;

- o were more engaged in the ENFI discussions, with the teacher and with each other--asking and responding to questions, seeking and providing clarification, continuing their own and others' topics, and elaborating on their own contributions so they were clear to others;

- o became more independent (especially those who sought a lot of help early in the year), writing their messages without as much prodding and sign language support.

The network writing seemed to develop and reinforce some important conversational skills, like initiating topics, staying on topic, requesting and providing clarification, elaborating, and asking and responding appropriately to questions. It also provided opportunities for attending to and modeling language for peers, that may not always happen in the classoom.

Kendall is a demonstration school and committed to innovation, so many new ideas come and go and teachers are often overwhelmed with too many new projects. A powerful testimony to the success of ENFI is that it has caught on and has become an established part of Kendall's curriculum. We would like to see the same thing happen at other schools for deaf students.

For more information about ENFI, contact:

Trent Batson or John Scully
ENFI Project, HMB E230
Gallaudet University
800 Florida Ave. NE
Washington, DC 20002
202-651-5494

for an annotated bibliography of publications about ENFI and copies of the appendices to this report.

Martha French or Judy Lenard
PreCollege Programs
Kendall Demonstration Elementary School
Gallaudet University
800 Florida Ave. NE
Washington, DC 20002
202-651-5504

for information about setting up ENFI and developing ENFI activities for elementary school and middle school children.

Joy Peyton
Center for Applied Linguistics
1118-22nd Street, NW
Washington, DC 20037
202-429-9292

for information about the ENFI research, at college and precollege levels.

TABLE OF CONTENTS

INTRODUCTION: THE CONCEPT BEHIND TEAMING WITH TEXT 1
Trent Batson and Linda Delk

ENFI IN THE CLASSROOM:
WHAT IT LOOKS LIKE, HOW IT WORKS,
THE CHALLENGES IT POSES 11
Joy Kreeft Peyton

PROJECT GOALS AND METHODS 23
Joy Kreeft Peyton

ENFI AS PART OF A WHOLE LANGUAGE PROGRAM 29
Martha French

ENFI ACTIVITIES AT KENDALL 33
Joy Kreeft Peyton and Anne Marie Baer

FACTORS THAT CAN INFLUENCE THE QUALITY OF NETWORK
DISCOURSE 63
Joy Kreeft Peyton and Martha French

INTERACTIONAL SCAFFOLDING IN NETWORK CONVERSATIONS 87
Joy Kreeft Peyton and Martha French

STUDENT DEVELOPMENT 101
Joy Kreeft Peyton
With Heather Jilao and Leslie Brewer

INSTITUTIONALIZING ENFI AT KENDALL SCHOOL 133
Judy Lenard

IMPLEMENTING ENFI AT CLINITE 139
Antonina Cardinalli

DISSEMINATING ENFI BEYOND KENDALL AND CLINITE 143
Margaret Hallau

REFERENCES 145

The following appendices are available from the Gallaudet ENFI Project:

1) Available ENFI Software
2) Summaries of TWT Administrative Planning Meetings, 1-31-91 and 3-11-91
3) Recommendations to the Administration Regarding ENFI at Kendall
4) ENFI Workshop Evaluation Results
5) Implementation Report: William D. Clinite Center for the Hearing Impaired
6) ENFI Teacher's Activity Guide for Use With Elementary School Students: William D. Clinite Center for the Hearing Impaired

ACKNOWLEDGEMENTS

We are grateful to the Literacies Institute in Boston for providing a one-year grant to begin the ENFI research at Kendall, which formed the basis for this project. The funding for this phase of the project came from the Department of Education, Office of Special Education and Rehabilitative Services.

The following Kendall teachers have enthusiastically tried new ideas, attended meetings, met with project team members, let us into their classes, given feedback on sections of this report, and made presentations for others: Leslie Brewer, Dayna Brown, Barbara Hunt, Heather Jilao, Babs Kaufman, Marsha Morales, Yetti Sinnreich, and Anne Sullivan. At Clinite, Rich Graham (principal), Angie Ruiz (teacher), and Judy Boston-Shedd (computer lab coordinator) did the same.

The students we worked with put up with us as we peered over their shoulders into their computer screens and were eager to talk with us about what they thought and what they were learning.

John Scully, Nancy Creighton, and Kavita Pipalia provided computer assistance and administrative support throughout the project, and John Scully put this report in its finished form.

INTRODUCTION: THE CONCEPT BEHIND TEAMING WITH TEXT

Trent Batson and Linda Delk

Teaming With Text is a joint project of Gallaudet University's ENFI Project, the Kendall Demonstration Elementary School on Gallaudet's campus, and the William D. Clinite Center for the Hearing Impaired, in Tulare, California. All three institutions provide education and services almost exclusively to deaf students. The Teaming With Text (TWT) group set out to see how a new computer network environment for teaching writing (ENFI) could be integrated into the curricula at Kendall and Clinite. The integration effort was carried out by a partnership among research teams with compatible interests and experiences.

ENFI, Electronic Networks for Interaction, is an established and tested college-level computer environment for teaching writing.[1] It involves a computer network set up in a room where students and teachers meet and communicate in writing rather than talking during part or all of the class. The ENFI Project was started by those directing TWT.

Now, at the end of the TWT grant period, we can say that TWT succeeded. It succeeded for a number of reasons:

* the ENFI environment is compatible with both the whole language approach at Kendall and the mainstream approach at Clinite;

* the research teams from both the University and Kendall working on the Project were cohesive and experienced. They were therefore able to establish a strong working relationship that will continue past the grant period for TWT;

* the Project involved end-users (teachers and support people) early on and throughout the Project;

* strong on-site technical support was available both in Washington, DC and in California;

* the technology was mature; and

* a body of research about ENFI was already completed before TWT started.

What do we mean by "success"? We set out with certain expectations for ENFI because of our past experience at the college level. We might call these expectations our "vision" for ENFI: that students would be engaged in social interaction in a literacy-rich environment,

---

[1] The ENFI Project distributes a number of publications from its 8 years of operation; among them is a final report of the ENFI Consortium project, a three-year study of ENFI applications at 5 universities. For this study, only some of the university students were deaf.

using written language for communicative purposes, and so developing confidence and competence in their literacy abilities. Because our experience at the college level had led us to believe in these values of ENFI, we hoped

1) to find a substantial number of teachers at Kendall and the Clinite Center who would find uses for ENFI in their teaching, and,

2) then, to "institutionalize" ENFI at both sites so that ENFI work would continue long after TWT's grant period had ended.

A third goal was that these uses of ENFI would fit with what were already intelligently crafted -- meaning-centered and child-centered -- curricula at Kendall and Clinite. Within the goals of these curricula, the teachers at both Kendall and Clinite actively experimented with ENFI and discovered possible new strategies for achieving their teaching and learning goals.

The TWT team succeeded in all three of our goals, both at Kendall and the Clinite Center. The chapters that follow will expand on this story. But, for now, to grasp the significance of TWT, we need a context, both for ENFI and for language learning within deaf education.

Deaf Education

As anyone who has worked within deaf education knows, many different philosophies have been put forward during the hundred-and-eighty-five years since deaf education began in the United States at the American School for the Deaf in Hartford, Connecticut. These philosophies have been and are ostensibly about language, but are also about what it means to be a deaf person in a hearing society. Probably most people outside of deaf education have heard about the "oralism-manualism" controversy within deaf education, which is the argument about whether it is best to teach deaf children through speech (oralism) or signs (manualism). The terms of this argument have shifted during recent years, and now people argue not about whether to use sign language or not, but about ways to use sign language, or what form of sign language to use, or how to create a bilingual environment. Linguistic research in the last thirty years has established American Sign Language as a language in its own right, which challenges the ways that educators see the educational role and uses of sign language in general. We don't enter into this argument on one side or another in this report, but simply give some background for the work undertaken during the Teaming With Text Project. TWT is, after all, a way of making English visible (on computer networks), so, in a sense, can be seen as a wonderful middle ground between those who insist on English and those who insist on accessibility: on the network, the language is English, but, at the same time, it's visible!

Those who have tried to make English accessible to deaf students in the past have tried a number of different strategies. These efforts begin with such 19th Century innovations as

earhorns, early experiments with bilingualism (American Sign Language and English), and passing a slate and chalk back and forth for deaf and hearing individuals to write on. Early in the 20th century we see such devices as hearing aids and subtitled movies; later, in mid-century, we see audio loops, TDD's, and rings of overhead projectors; and then, more recently, experiments such as Signing Exact English, Cued Speech and cochlear implants. Speech training of one sort or another continued throughout all this time, though such training may be better understood as an attempt to make English accessible not to the deaf person but to his or her hearing interlocutors.

This partial list of attempts to make English more accessible for deaf students suggests both the difficulty of the problem (making a spoken language accessible to people who can't hear) and the inventiveness of people when faced with a seemingly insurmountable problem.

ENFI

ENFI and TWT are part of this century-and-three-quarters old effort to make English more accessible to deaf students. Because ENFI allows teachers and students to write to each other during class rather than talk or sign to each other, the English they are using for communication is visible. Everything that anyone writes becomes visible to the whole group; it's as if everyone is posting messages to one bulletin board which everyone else can see. After a time, as people read messages on the bulletin board and begin to respond to those messages, a written group conversation begins.

In this environment, communication is not funneled through the teacher, but is a group activity. Students talk to each other as well as to the teacher.

There are many things that can be said about ENFI. It is also used within regular education and is now a standard option on over a hundred college campuses, so it is being used in many different ways. But the key thing to say about ENFI within deaf education is that it provides a means for English to become more vital, communicative, and interesting for deaf students. We had found, even before we began the TWT project, that ENFI (in the hands of a sensitive and creative teacher) proved to be more productive than traditional means for helping deaf college students move toward standard English.

Why is this so? Becoming more capable in thinking within a language is closely tied to interaction within that language, particularly interaction with people who have differing competencies in structures of the language. When we say "differing competencies," the teacher is not the only person we have in mind. Certainly the teacher is one of those with differing competencies, but so are one's fellow students. A student may have trouble with subjunctives or spelling in English, but other students may be strong in those areas. Some students may not have an extensive vocabulary or may not know how to use articles very

well, while others do. Students and teachers can work together to create "scaffolds" for each other, using linguistic structures that are not yet shared by all, but which help boost competency among all. Students will make errors, but this is true when all people are learning to speak, or trying any new skill, and people still learn the new skill.

In such a collaborative environment where students and teacher have equal opportunities to participate, aren't errors reinforced unless the teacher can correct them quickly? It might seem so, since the students are not expert users of English and the one expert, the teacher, is just one more line on the screen. But the same situation applies for learning one's primary language. Children talk or sign to each other as they grow up, often without an expert user of the language nearby. Yet, they generally tend toward the norms of usage in their language. Since a little ENFI community of English users likewise is not isolated on a desert island, it will also tend to be normed over time. Both the teacher and other English users continue to provide models and scaffolds of standard English structures. The road to competency is paved with both error and good models. The errors children make in language are not out-and-out errors, but the result of creative application of incomplete mastery of linguistic rules.

ENFI provides a setting much like that within which people learn a first (spoken or signed) language. ENFI allows for natural language acquisition principles to be applied. It also supports much of the most recent theoretical thinking about writing, such as the importance of writing for real purposes and other whole language concepts. Students communicating on an ENFI network aren't working only to please the teacher but to actually communicate with each other in real time. The purpose of their communication is not only for evaluation, but to develop social cohesiveness and understanding with their peers.

The Vision Behind TWT

We took into account both the historic efforts within deaf education to make English accessible and the efforts more generally among educators and linguists to make writing instruction more like natural language acquisition when we conceived of Teaming With Text. The double meaning of the title "Teaming With Text" is intentional:

* Teaming means that students work collaboratively to help each other with their literacy skills by working in a situation that is

* "teeming" with text. We wanted students to work within written text on the network so they would feel comfortable in the world of literacy.

There is no learning strategy more productive than realistic, guided practice, and that's what the ENFI environment provides. We knew before we started developing the TWT ideas that Kendall had in place a whole-language curriculum, which we understood to mean that

language instruction, on a mechanistic to humanistic continuum, would be far toward the "humanistic" end of the continuum. Students would learn literacy skills not in isolation, not separated from communication, but through using writing and reading for real purposes. When we first began meeting as an integrated team of the University research team and the Kendall researchers (we met separately with the Clinite people), we could see that ENFI ideas and Kendall's orientation were almost ideally compatible.

Literacy skills have often been developed in the U. S. as if reading and writing consisted of sets of isolated skills to be mastered one at a time. In contrast, on the network writing is immediately communicative, so it is not a lesson but is more personal. Literacy skills are not some technical area of expertise separate from one's daily life, but fully integrated. Students make use of both their world knowledge -- including their place in it -- and their linguistic knowledge to construct meaning from what they read and for when they write.

The Current Language Environment within Deaf Education

In the last couple of years, educators working with deaf students have attempted to adjust their teaching approaches to the latest theories about learning and language. Linguists have made constant progress in their description of American Sign Language and in their understanding of how to use languages (ASL and English) most productively in the education of deaf children.

Since American Sign Language (ASL) is a visually-based language, it is the language most easily accessible to the average deaf person, and so has the potential to be a powerful educational medium. (We say it "has the potential" because not all young deaf people are exposed to ASL, since the parents of most deaf children have normal hearing.) To the extent that all humans create themselves and their world through language, language is central to human existence. The fuller the linguistic experience, the fuller the life. However, because deaf children cannot hear complete auditory models, spoken languages are hard to learn. Therefore, encouraging them to depend entirely on spoken languages may also force them to live their lives without the best linguistic tools available. We have to remember that the written form of a language is the secondary form of the language; it was developed as an analogue to the primary, spoken, form.

Even though deaf children may be able to communicate to some extent through the communication signals that are transmitted by hearing people when they are speaking English, this is hardly a "full linguistic experience." Still, some "deaf" children were not born deaf, so did gain some sense of English syntax and intonation patterns before becoming deaf. On that basis they can build speech-reading skills. Others may not be completely deaf but enjoy some residual hearing, so also can function to some extent in a sound-based communication situation. We can see, therefore, that though ASL or some kind of clear and

consistent signing (that is, visual communication) is the richest resource to use in face-to-face interaction with deaf children, there are many communication variables among the young deaf population.

We know that the extra difficulty that deaf children experience in learning spoken languages (even just to read and write them) is not due to lack of ability, lack of intelligence, or lack of motivation, but instead to lack of access to adequate visual models of the spoken language. Instructional strategies and technology that can neutralize this physical barrier can provide deaf children with access to the same high quality language models and ways of using those models that hearing children have.

Since more and more educators of the deaf recognize the value of using ASL or at least clear "contact signing"[2] in the classroom, administrators, teachers, and researchers alike are considering how to change current language policies within schools where deaf children are taught. Part of the ENFI vision is based, therefore, on our increased understanding of languages and communication that has grown out of thirty years of research in linguistics and discourse. We not only have a more sophisticated understanding and appreciation about how people learn and use spoken languages, but we also know that natural languages need not be sound-based. ASL is as complex and rich as any spoken language. And, like other natural languages, it plays a central role in the maintenance and growth of culture -- the culture of Deaf persons.[3]

Within this atmosphere of heightened interest in use of ASL and contact signing, ENFI and TWT emerge as a logical context for linguistic development. On the computer network, English can attain some of the same communicative vitality as ASL. Therefore, during the last year of the TWT project, as we saw Kendall begin to examine new options within its

---

[2] Contact signing used to be called "Pidgin Sign English," but recent studies have shown how little the "contact signing" between hearing and deaf people is like true pidgin forms of languages. Contact signing, when produced by hearing people, generally follows English grammatical structure, but may employ occasional ASL features. It can be a clear communicative form if the hearing person does not use her voice while signing, which overwhelms the visual modality and leads to "distracted signing." That is, the hearing person who voices while signing tends to make some incorrect signs, not include a sign for each word spoken, and add unnecessary hand movements as speech rhythms demand.

[3] Deaf with a capital "D" refers to Deaf Culture while deaf with a lower-case "d" refers to an audiological condition.

total communication policy,[4] we were encouraged that our ENFI initiative might gain even more acceptance and use in the years to come.

Bilingual and multilingual education programs have grown in regular education to meet the needs of a more diverse population. The literature suggests that educators need to consider issues about bilingual education and literacy along several dimensions, including

a) the contexts in which bilingualism occurs,

b) the development of bilingualism, and

c) the media used in teaching (face-to-face, computer, or traditional print).

---

[4] In 1979, Gallaudet's Pre-College Programs adopted a Total Communication policy (Cokely, 1979), which continues to guide communication at the Kendall Demonstration Elementary School. Following are some of the main points that undergird the approach to Total Communication taken at Kendall:

1. Total Communication is not a method, but rather a philosophy of approaching any given communication situation.

2. Total Communication means adjusting one's communication approach to fit the situation and the receiver. No one mode of communication is equally effective with all students in all situations. Therefore, the goals of each situation must be assessed, as well as the student's expressive and receptive communication modalities.

3. The individuals involved in any given communication should be aware of each other's capabilities and limitations, and respond in modes which are suitable to their capabilities and developmental stages.

4. The philosophy of Total Communication holds that there are different stages of communicative development, and there may be more than one language involved. Thus, different communication modes may be emphasized at different developmental stages.

Child-centered Total Communication uses communication modes individually or in combination, depending on what is most effective for the individual children involved in any situation. These communication modes include:

1. Receptive strategies
   - \+ speechreading
   - \+ reading
   - \+ audition

2. Expressive strategies
   - \+ speech
   - \+ writing

3. Receptive/Expressive strategies
   - \+ gestures
   - \+ media
   - \+ manually-coded English
   - \+ pantomime
   - \+ dramatic strategies
   - \+ American Sign Language
   - \+ art

Access to and use of different kinds of media influence teachers' options in planning and providing bilingual education. Media influence whether successive or simultaneous exposure to two languages is possible. Media choices may be influenced by whether the structures of the languages are similar or dissimilar. Media also present options for using languages to present instructionally convergent or divergent scripts (Hornberger, 1989).

Educational programs serving deaf children, like Kendall, are also coming to grips with a special form of bilingualism -- providing deaf children with opportunities to become competent in both English and ASL and exploring how to best use both languages to improve academic achievement and communication.

At the time the Total Communication policy was written, in 1979, personal computers and other computer-based technology were not yet being used for instructional purposes at Kendall. The "media" communication strategy mentioned in the policy included audiovisual options available at that time, such as overhead projectors, film loops, captioned films, and amplification loops. In the decade since, the potential communication strategies available through technology have mushroomed. ENFI is one of those strategies.

The Pre-College Total Communication policy was indeed farsighted when it stated that its goal was "the development of linguistic and communicative competence (in English and American Sign Language) in order that the child may utilize appropriate communication strategies in various situations he or she will encounter." (Cokely, 1979, p. 11)

In today's high technology, information-driven world, children encounter many situations in which computer communication innovations not even dreamed of 20 years ago are now becoming commonplace. Many communication opportunities are now open to deaf students who can take advantage of such devices as programmable TDDs, programmable hearing aids, personal computers, communication networks, television decoders, FAX machines, videodisc instruction, and telephone relay systems. These devices are part of the "cultural tool kit" (Bruner, 1990, p. 21)[5] our society has created to increase access to interpersonal communication by neutralizing such barriers as time, distance, or lack of hearing.

---

[5] ". . . biologically imposed limits on human functioning are . . . challenges to cultural invention. The tool kit of any culture can be described as a set of prosthetic devices by which human beings can exceed or even redefine the 'natural limits' of human functioning" (Bruner, 1990, p. 21).

Conclusion

ENFI is an innovative addition to the instructional tool kit of teachers in deaf education. Given the convergence of technological, linguistic, cultural, and educational developments, ENFI is a strategy that seems the right thing at the right time. It permits teachers to engage deaf students in conversation in visible, written English. Such an ability invites a number of imaginative applications, as this report shows.

As teachers at Kendall discovered new ways to use the network, the use of ENFI at Kendall expanded from one or two occasional users to a core group of eight or so regular users. ENFI was thought of at the beginning of this project as perhaps an interesting computer gimmick, but by the end is considered a standard option for teachers. The vision of students learning literacy skills through realtime written interaction with peers and teacher has become a reality.

In the following chapters, the story of how this all happened is told.

ENFI IN THE CLASSROOM: WHAT IT LOOKS LIKE, HOW IT WORKS, THE CHALLENGES IT POSES

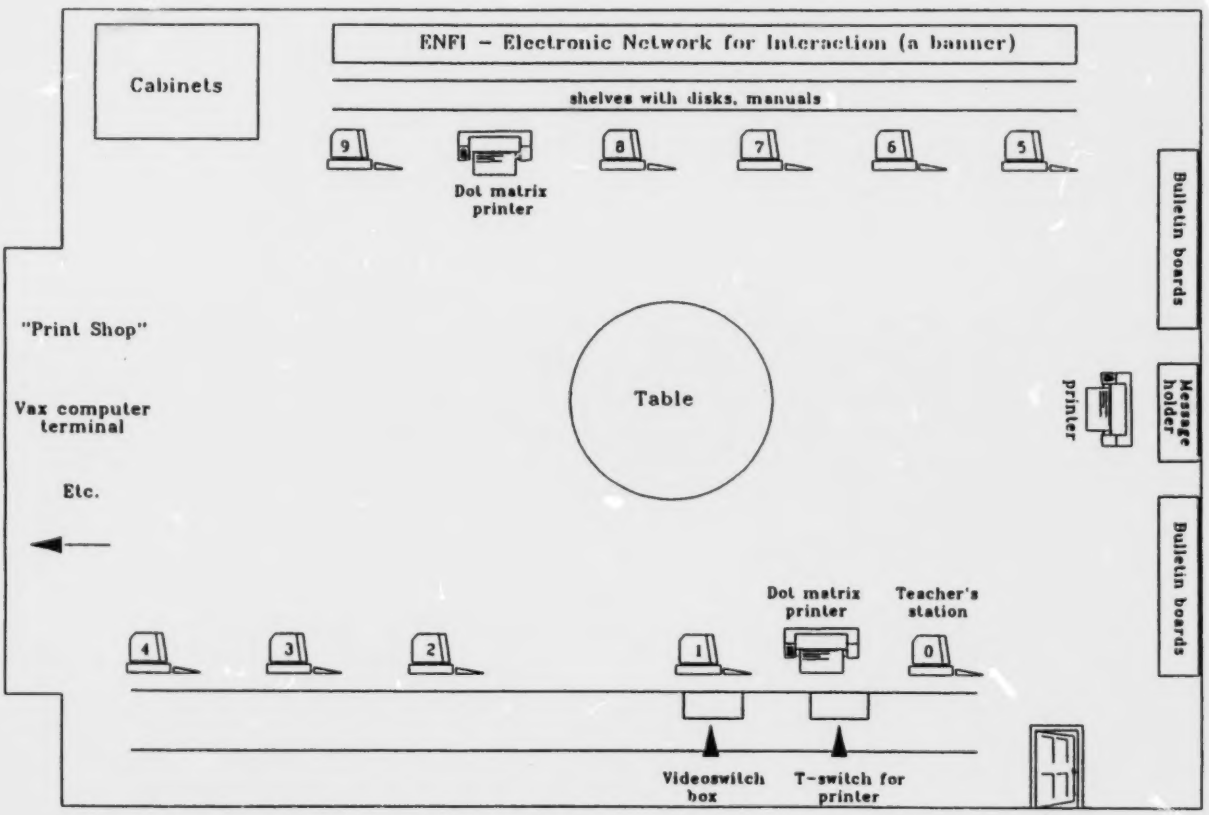
Joy Kreeft Peyton

ENFI is a teaching and learning medium, a way for deaf students and their teachers to communicate with each other in real time, in written English. It is not a particular hardware and software or even a particular teaching methodology, although as we have argued elsewhere in this report, it is compatible with whole language approaches and with the bilingual approaches now being developed in deaf education.

This section describes the setup of the ENFI lab at Kendall, the hardware and software needed to set up an ENFI lab, the nature of the interaction in ENFI sessions, some of the issues that teachers and schools using ENFI have had to deal with, and the solutions they have come up with.

The ENFI Lab and Software

An ENFI computer lab can be set up in a variety of ways. In the lab at Kendall School during this project, the computers were distributed around the outside of the room, facing the walls (see Figure 1 on the next page). The lab was set up this way before ENFI software was installed, because it was assumed that it would be used by teachers working alone, using word processing. This setup turned out to be useful for classroom instruction in some ways, but not useful in others. Because the center of the room was empty except for a round table for magazines and papers, students and the teacher could easily turn in their chairs or walk around the room to sign with each other, and some classes made extensive use of this signing space. On the other hand, some of the teachers were frustrated because they couldn't see the students without turning around. These teachers preferred a different configuration, with the computers in a circle, facing the center of the room and each other. When the ENFI lab was moved to another space in the second year of the project, the teacher's computer was placed to face all the others. Some labs now have desks in which the computer screens are lowered into the desk flush with the desk top and covered with tinted glass, so participants can see each other easily.



ENFI Lab at Kendall Demonstration Elementary School.
Numbered computers are networked IBM PCs.
Computers face the walls.

Figure 1

The software used at Kendall is Realtime Writer, developed by Realtime Learning Systems in Washington DC, which runs on IBMs and IBM-compatible computers. (The first software used at Kendall was DCA's 10-Net CB utility, which worked essentially the same way as the software described here, but was simpler to use and less powerful, as described elsewhere in this report). With this software, the computer screen is divided into two windows. In the lower window, individuals compose their messages, which remain private until the writer hits a key and the message is transmitted immediately to the upper, public part of all of the screens in the class, tagged with the name of the sender. As new messages are typed and sent, they scroll up the screen in a continuous dialogue, like a play script. The computer stores the entire discussion, which can be reviewed at any point during the class session and printed out in its entirety at the end. Discussions occur on different network channels, each of which can include from two participants to the entire class. Using a video switch the teacher can at any time view the writing of an individual student or a group of students on a channel, or can display the writing of one student to the entire class. The size of the composing window can be set to accommodate from three to ten lines of text; most teachers in the project kept the default setting, which is six lines.

Figure 2 shows a sample student screen with this software. One student's (Sally's) message appears in the lower window, visible only to Sally, and teacher and student messages that have been sent to the class appear in the upper, public window. The class is working on Channel 1.

Although when the ENFI Project started at Gallaudet only Realtime Writer was available, there are now two other types of software used for ENFI-type interaction. Each works in a slightly different way and offers different options, but the basic idea is the same, a real-time written discussion between pairs or among classes or small groups of students and teachers. Daedalus InterChange, developed at the University of Texas at Austin, runs on both IBMs and Macintoshes. InterChange, which allows real-time ENFI-like conversation, is one part of the Daedalus Instructional System, which includes a number of different writing options, including word processing and electronic mail. Aspects, another type of software, runs on Macintoshes. The Chat Box, which allows group writing and drawing, is one part of a collaborative working package that includes a word processing system.

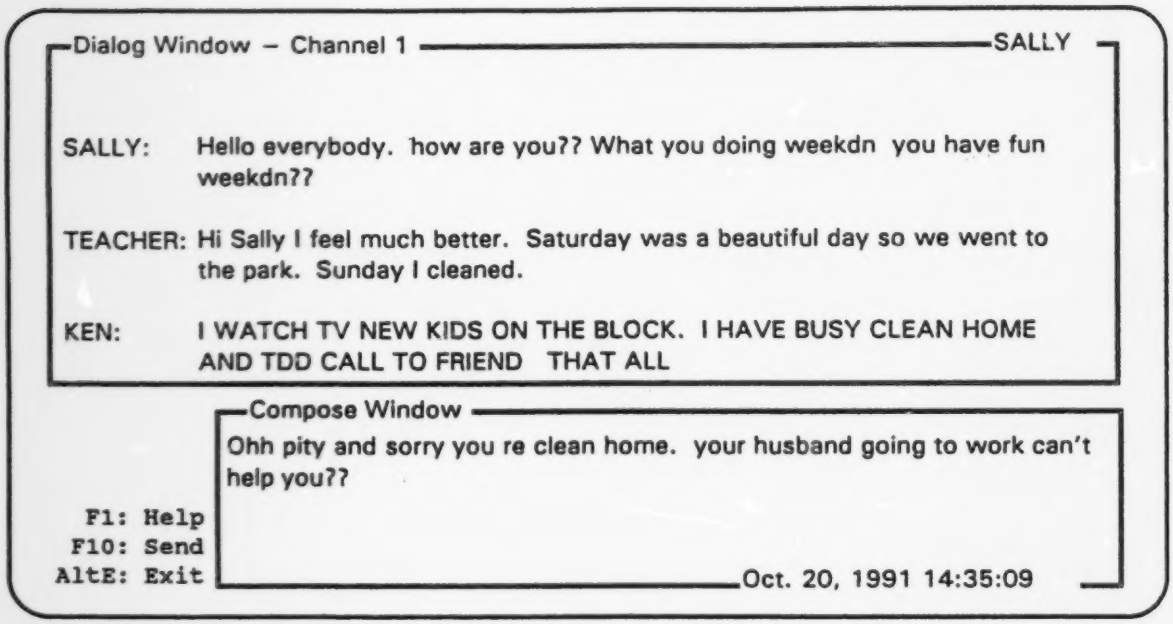

Dialog Window – Channel 1
SALLY
SALLY: Hello everybody. how are you?? What you doing weekdn you have fun weekdn??
TEACHER: Hi Sally I feel much better. Saturday was a beautiful day so we went to the park. Sunday I cleaned.
KEN: I WATCH TV NEW KIDS ON THE BLOCK. I HAVE BUSY CLEAN HOME AND TDD CALL TO FRIEND THAT ALL
Compose Window
Ohh pity and sorry you re clean home. your husband going to work can't help you??
F1: Help
F10: Send
AltE: Exit
Oct. 20, 1991 14:35:09

Figure 2 ENFI Computer Screen with Realtime Writer Software

Besides the software, the following are needed to set up an ENFI lab:

- Computer stations with network cards and cables. Most schools prefer to have one station per person in a class, if possible. If that is not possible, students can be paired at a station;
- A dedicated server;
- A network operating system; at this point, Novell is the most common.

Interaction in ENFI Sessions

The primary mode of communication in most ENFI sessions is writing. The dialogue below, between paired deaf elementary school students, 7 and 8 years old, gives an idea of what the interactions look like.

Megan	Hello Helen, are you ready?
Helen	yes
Megan	Good, I got alots of presents
Helen	what dose?
Megan	Please repeat, I don't understand what you mean.
Helen	oh "what you did dose"?
Megan	What dose?
Helen	i mean what you did got christmas?
Megan	Oh okay, I got clothes, shoes, and some toys!! And some cabbage patch dolls too.
Helen	i got clothes, puppy pound, fluppy dog, and etc.
Megan	I got six newborn pound puppies for christmas too.
Helen	i don't know true or false about pound puppies?
Megan	Oh, thats part of toys.
Helen	false
Megan	Yes, right, you know all toys are false.
Helen	I have cabbage path's clothes
Megan	oh, that nice, I got two cabbage patch kids dolls.

Issues Raised by ENFI Use

Different ENFI approaches present different challenges, but the following issues are faced by most ENFI teachers and schools. The solutions found to address these issues can have a major impact on how successful ENFI becomes.

Setting Up and Managing the Technology

Introducing even one computer with a word processing program can present a major challenge to a teacher, a school, or a classroom, and a computer network is more complicated. Especially at the beginning of the year or term, someone has to be responsible for setting up the technology and making sure it runs smoothly. Teachers working on a tight schedule may not feel they have time to get the network going and the students logged in at the beginning of a session, and to get them logged out properly at the end. They also may not have time to print a transcript at the end of each session. A series of difficult days will cause some teachers to stop using ENFI altogether.

As is described in detail in other parts of this report, Kendall and Clinite have had considerable difficulties with the Realtime Writer technology, and both schools have found that they need to have a knowledgeable computer person--the school principal and a teacher aide at Clinite, and a lab assistant at Kendall--available to help classes get in and out of the network program, solve problems that come up, and print the transcripts for the teachers to pick up later. Kendall started out using DCA's 10-Net cb utility, which is much less powerful than Realtime Writer and not commercially available. We switched to Realtime Writer because of its more general availability and increased options, but this switch also introduced technical difficulties that we did not anticipate. As network software becomes easier to use, we hope that this special technical assistance becomes unnecessary, but so far it seems essential for ENFI to remain viable.

Getting Used to Written Interaction

ENFI interaction is different in a number of ways from the kinds of classroom interactions that most teachers and students are used to. The most obvious difference is that participants in ENFI discussions must read and write at the same time. While they are trying to compose their own contributions, the writing of others is scrolling up the screen, often rapidly. At first this dynamic can seem overwhelming and to some, impossible to handle. But like learning a foreign language, which at first seems impossibly fast and later seems to slow down, this new way of communicating eventually becomes comfortable and familiar for most

ENFI users. They learn to think and type faster, focus more on particular messages and less on others, and to fit in with the rhythm of their group.

The second difference has to do with who contributes to the discussion and when. In most face-to-face classroom interactions, teachers decide this by posing questions and calling on students, but on the network students can type and send messages whenever they want to. Thus, most ENFI teachers initially feel a tremendous and disconcerting loss of control, which is so upsetting to some that they stop using ENFI entirely. They feel they can't think or type fast enough to stay ahead of the students, and the students often ignore them anyway. Other teachers have found that they actually prefer to fit into an ongoing conversation that everyone is responsible for, rather than controlling it all the time. Still others have found ways to control the discussion by setting up turn taking rules, until everyone becomes more comfortable with the new conversational dynamic and the teacher can relinquish the reins a little.

Third, unlike face-to-face conversations, ENFI conversations often involve more than one conversational thread at a time, especially when more than two people interact together on the network (this dynamic is discussed in detail, with examples of multiple threads, in the section on "Factors that can influence the quality of network discourse"). Participants can send messages whenever they want to, and messages are not seen by other participants until they are sent. So even if everyone agrees to focus on the same topic, some people will take the topic in one direction, while others take it in another. There is no way to change this dynamic unless the class agrees that one person will write and send a message at a time, and that no one will reply until they have read that message. But a structure like this quickly becomes tedious for everyone. What happens more often is that participants get used to, and even enjoy, having different topics or different aspects of a topic discussed at one time, and they pick the threads they will follow and develop.

Integrating Writing and Sign Language

Initially at Gallaudet, ENFI sessions were considered an English immersion experience, with little or no accompanying sign. But when we started working with elementary school students, who needed more sign support for their writing, network writing became closely intertwined with signed communication. Current bilingual approaches in deaf education emphasize the use of students' stronger, more familiar language (ASL or some other form of sign language) to support and extend their weaker, more unfamiliar language (written English), and educators are seeking ways to effectively integrate the two. Throughout this report we give examples of different ways that teachers have developed to integrate signed and written interaction before, during, and after ENFI sessions.

Integrating ENFI Activities with Other Parts of the Curriculum

Teachers usually have many more things to accomplish than time to do them, and ENFI is one more thing to add to an already full schedule. An ENFI session might involve walking to a lab some distance from the classroom, getting students settled down and concentrated on a task, and getting them off the network and back to their classroom at the end of the session. Teachers have found that they need at least 40-minute time periods to do this, and an hour is better if possible (however, if the sessions are too long, 1 1/2 to 2 hours for example, students get bored and restless). The teachers at Kendall have so far only been able to make time for ENFI once a week, but at least twice a week seems ideal, to give students more opportunities to write in this interactive context and to make the whole process more familiar and routine.

Those teachers who have experienced the most success with ENFI and who have continued with it have made it a vital, substantive part of the curriculum they already have in place. ENFI is used to augment and extend things they already had been doing in sign--to discuss readings, solve math problems, propose real-life problems and solutions--rather than as an extra activity that doesn't fit into the rest of the program, and the lab session itself is accompanied by preparation and followup activities. When ENFI is not an important part of the instructional program, it is quickly crowded out by other, more pressing things.

Adapting Familiar Teaching Habits and Materials to the New Medium

Teachers often have a preferred teaching style and a complicated repertoire of accompanying materials--the blackboard, overhead projector, books, articles, handouts, videotapes, and manipulatives, as well as personal gesture and movement. When seated behind a computer screen facing students who are also behind screens, they sometimes feel powerless to do the things and use the materials they have become so comfortable with. As Doug Miller, an English professor at Gallaudet University has put it,

> I've taught for 11 years, and there are certain things that I like to do. I work with transparencies as a kind of team, pointing to things, making arrows, going from one side of the projector to the other. I stand up and talk about the ways that paragraphs are supposed to be arranged. I jump around and use my body. I've gotten used to using my body as a way to communicate.
>
> When I started using ENFI, I would take the materials for my regular freshman English class in the morning and run to my ENFI class in the afternoon and then think, "What am I going to do with these things?" I realized I couldn't even pass

them out, because then the students would have to look at something else other than the screen.

Instructional materials can still be used, but the ways they are used must usually be adapted. Teachers can still use the blackboard, but it usually works better to use it before or after the ENFI session, to present new vocabulary (before) or review vocabulary, structures, and concepts used on the network (after). Discussions of readings are best done with brief texts, articles rather than books, that students have read ahead of time and need to only refer to during the discussion. Some teachers have found it helpful to number the paragraphs of a reading that is handed out to everyone, for easy reference. Handouts that students read at the beginning of the ENFI session, before they start writing, can help guide student participation and provide students with problems to discuss or scenarios to create as well as with vocabulary they might need.

Teachers quickly discover that the network is not a good place to present new material in the form of a lecture. The medium is simply too slow and too cumbersome to sit and type a long discourse about a new topic, and students become bored reading it. Rather, the network is better used for group discussion, for collaborative working out of a topic. Rather than a lecturer delivering wisdom from on high, the teacher becomes a facilitator, part of the ongoing group discourse. Most teachers come to welcome the change.

We have discussed briefly here some of the key issues that the teachers we work with have faced when starting to use ENFI. Other teachers will have their own issues, or these will take a different form and the solutions provided here will not work in exactly the same way. We hope, however, that the discussion and examples from ENFI transcripts in this report will give the reader ample information so that issues and problems that arise can be handled confidently and creatively.

PROJECT GOALS AND METHODS

Joy Kreeft Peyton

The purpose of this project was to demonstrate strategies by which elementary school deaf students may improve their skills in writing and reading. This purpose is accomplished by developing, studying, and disseminating ENFI activities that are appropriate for students this age (students from 9 to 14 years old were involved), and that are consistent with the whole language philosophy and curriculum in place at Kendall Demonstration Elementary School in Washington, DC. In this section, we describe our methods for developing these practices and for studying their effectiveness. (A separate section of the report describes our dissemination efforts and plans.)

Developing ENFI Activities

Our development of appropriate ENFI activities for the elementary school level did not occur in a vacuum, but rather was informed by philosophies and activities already in place:

> Kendall School already had a comprehensive and well-developed curriculum in place, based on whole language principles and a process approach to writing.
>
> With support from Gallaudet University and the Mellon and ADAPSO foundations, some Kendall teachers had already used ENFI and developed a number of activities.
>
> The ENFI Project has been ongoing at Gallaudet University since 1985, and many of the activities developed for college students were adapted for elementary school students. (A teacher manual edited by Biel, 1989, contains descriptions of ENFI activities for deaf and hearing college students.)

At the beginning of the project (fall 1990) we identified teachers who were interested in working with the project team for the school year to use ENFI regularly (at least once a week with each class involved), experiment with different activities of their choice, assist us in data collection and analysis, and reflect with us on the progress and success of their work, in individual interviews and project meetings. Seven teachers, listed below, were involved in the project. Some had used ENFI the previous year, and some had worked closely with another, more experienced ENFI teacher, who had served as a mentor to get them started. Some were new to ENFI and needed support getting started.

Leslie Brewer and her classroom aide, Barbara Hunt
13-year-old students in the Special Opportunities Program (SOP),[6] using ENFI for problem-solving activities

Heather Jilao
12-year-olds, Special Opportunities Program, using ENFI to develop basic English literacy, thrcugh open ended conversations

Barbara (Babs) Kaufmann
9-year-olds, using ENFI for a variety of Language Arts activities

Marsha Morales
13 & 14-year-olds, using ENFI for discussions of readings

Yetti Sinnreich
13-year-olds, using ENFI for discussions of readings

Anne Sullivan
13 & 14-year-olds, using ENFI for solving math problems

The teachers used ENFI for activities that were consistent with their students' ages, levels of English proficiency, and with their own goals for their classes. Some chose one type of activity that they continued for the entire year, adapting it for classes with different English proficiency levels. For example, Yetti Sinnreich used ENFI for discussions of reading texts, adapting the texts and the nature of the discussion for different student groups. Others tried various activities until they found those that were successful with their students. For example, Babs Kaufman started the year pairing students to work on separate channels, without teacher participation, but found that the students were writing at a level that she perceived to be far below what they were capable of. She decided that in order to challenge them and advance their reading and writing skills, the teacher needed to be on the network with them, and she developed two whole-class activities that included the teacher--discussions of stories the students had read, and planning sessions for upcoming events. She and the project research assistant, Anne Marie Baer, also developed a story-creation framework based on Indiana Jones adventures, in which small groups of students, working with a teacher or teacher aide, pretended they were on an Indiana Jones-type mission and were presented with problems that they needed to solve.

---

[6] The Special Opportunities Program serves deaf students with special needs or additional disabilities.

All of the activities developed during the 1990-91 school year and deemed successful by the teachers and the research team, and some developed earlier by other teachers, are described in the section on "ENFI activities at Kendall." Of course, not all of the activities attempted were successful. One unsuccessful activity is discussed above, with Babs' students. Others are described in other sections of the report, particularly the sections on "Factors that can influence the quality of network discourse" and "Student development."

Determining the Effectiveness of the Activities

The purpose of the project evaluation was to study the success of the ENFI activities developed and the writing development of the students involved. The evaluation plan was primarily ethnographic and qualitative, and involved the following activities:

Regular observations in ENFI classes. One hearing and one deaf researcher (either one or both) observed as often as possible in all of the classes involved. Both researchers served as participant observers, taking extensive field notes on the classroom setup and off-network interactions, helping the teachers with technical problems when they arose, and helping students with their network writing when they requested it. (The research assistant was very active in this regard. Since she is deaf, young, and an excellent signer, the students identified with her and often asked her for help.) In many classes, the observation period involved at least five consecutive classes at the beginning of the year and then periodic observations, around once a month, after that.

After the initial observation period in all of the classes, we chose three focal classes, which represented different dynamics that we were interested in documenting carefully. We observed in these classes nearly every ENFI session as well as selected preparation and followup sessions.

A bilingual approach, integrating intensive sign language preparation with written English on the network - Marsha Morales

Work with beginning writers, in the Special Opportunities Program - Heather Jilao

An approach involving posing problems for students to solve, first in sign language and then in writing - Leslie Brewer and Barbara Hunt

Videotaping of selected ENFI, preparation, and followup sessions in focal classes. In the focal classes, we videotaped four consecutive ENFI sessions, with their accompanying preparation and followup sessions, in the spring, when the teachers and students were accustomed to using the network and to the activities they were involved in. Besides being used for the research, these videotapes are being reviewed and catalogued to make a demonstration video for teacher workshops.

Interviews with ENFI teachers and students. Each ENFI teacher was interviewed at the beginning and the end of the school year to determine:

> the extent to which they believed the activities they developed provided unique opportunities for learning and language development, not available in other types of non-network activities;
>
> the ease or difficulty of planning for, implementing, and following up the activities;
>
> the extent to which the activities accomplished the teacher's and the curriculum's objectives;
>
> the extent to which the activities can be integrated smoothly and effectively into Kendall's language arts curriculum; and
>
> the apparent impact of the activities on the students' attitudes, learning, and language development.

The interviews were audiotaped (with hearing teachers) or videotaped (with deaf teachers) and transcribed.

We interviewed the students in the three focal classes, in a whole-class discussion format, at the end of the year to determine their enjoyment of and opinions about the success of each activity and their thoughts about what they had learned by using ENFI. These interviews were conducted in sign language, by the deaf research assistant, videotaped, and transcribed.

Collection of ENFI transcripts and other student writing.
We collected all of the ENFI transcripts from all of the classes involved in the project, whether or not we had observed the class (except in cases where there was a problem with the system and no transcript was available). Our set of transcripts ranges from 10 to 20 for a class, depending on how often the teacher used the network. The transcripts have become our primary data source, for they provide a nearly verbatim record of what occurred in the classes (except for the signed interaction, which is recorded on the videotapes and in the field notes). Thus, the

transcripts have allowed detailed documentation of the activities attempted and of their evolution over time, the interaction dynamics during the activities, and the development in written English of individual students during the year.

Some of the teachers also collected samples of their students' off-network writing, which are used to get a general idea of students' English proficiency in other contexts or, in a very few cases, to see how ENFI work transferred to other writing contexts (when the teachers connected ENFI and non-ENFI writing, which they did only rarely).

ENFI and interview transcripts, field notes, and videotapes collected from previous years, with these and additional Kendall teachers (Dayna Brown and JoAnn Mackinson), serve as additional data.

We have drawn from all of these data sources to develop a multi-faceted, composite picture of what actually happened in ENFI classes and what kinds of progress students made with written English, described in detail in the various sections of this report. In the section on "ENFI Activities," for example, we describe those activities that teachers and students, and our own observations, have determined to be most effective and most consistent with Kendall's philosophy and educational goals. This information will be further fleshed out in the teacher training videotape that we are producing.

The sections on "Factors that can influence the quality of network discourse" and "Interactional scaffolding in network conversations" describe the various strategies that teachers used on the network, the many ways that contextual factors influence what happens on the network, and the conversational dynamics that we believe promote language and literacy development.

In the section on "Student development," we follow the development in the network writing of six focal students in two classes, pointing as well to general trends found among all of the students. The teachers of those classes reviewed the preliminary findings and contributed to that part of the report.

Initially, we had planned also to make some quantitative comparisons of ENFI and non-ENFI students based on scores on standardized tests administered routinely at Kendall and on holistic scores of writing samples. However, it became clear early in the project that this was an unrealistic goal. The classes involved were small (for example, Heather Jilao's SOP class had four students), and in most cases there were no comparable groups. Since all of the teachers were trying different things, there was no <u>one</u> type of activity or setting that we could identify as "ENFI," to compare in any meaningful way with "non-ENFI" activities and

settings. There were as many (or more) different ENFI activities and strategies as ENFI teachers. Finally, it was soon clear to the teachers and to us that test scores and scores on writing samples that were generally unrelated to ENFI work would in no way enhance our understanding of ENFI.

We decided that the only sensible way to conduct an evaluation would be to immerse ourselves in ENFI classrooms, with ENFI participants, and to examine what they produced on the network, and to try to understand what we were observing. We believe we have done that, and the stories we tell from various perspectives throughout this report reflect our understandings.

ENFI AS PART OF A WHOLE LANGUAGE PROGRAM

Martha French

The most productive use of ENFI is not as an isolated exercise in written conversation, but rather as one part of a rich set of varied opportunities to communicate in sign language and in writing. ENFI is consistent with the philosophy of Kendall School's Language Arts program--a pragmatic, meaning- centered approach to language learning (signed and written), often referred to as a Whole Language Approach (French, Ewoldt, & Hallau, 1985). The Whole Language approach has its philosophical roots in the research and teachings of such pivotal individuals as Michael Halliday, Ken Goodman, and Frank Smith. Halliday's (1975) work on the functions of language has added to our understanding of the importance of learning language through social use. Goodman (1986) broadens our understanding of how to keep language instruction whole, child-centered, and relevant. Smith's (1985) description of the reading process has helped us focus on the real purpose for becoming literate--to make meaning. These concepts, and how they are given shape in ENFI activities, are described here.

Michael Halliday - The Functions of Language

Halliday's research has had a tremendous impact on our understanding of how children learn language. His work has taught us that learning language is learning to use language, "learning how to mean." Learning the structure, vocabulary, and sounds of the language is tied to the realization that language has meaning. Children learn language by being surrounded by sequences of language, used in social situations they are involved in. This language in use has purpose and social significance. It allows us to make things happen--demand objects and actions, control people and events, mediate relationships, develop concepts of self, ask questions about the world, extend reality through imagination, and inform others. If language is not used socially and for meaningful, functional purposes but is only studied in isolation, language learning does not occur.

Hearing children learn their native language, English, in a natural way that supports Halliday's concepts about language learning. Deaf children also learn their native language, American Sign Language (ASL), in the same manner. However, deaf children must also learn English in order to become literate members of society. For many deaf children this does not happen naturally as it does for hearing children, because they don't hear English, or only hear it in a limited way. Therefore, they are limited to learning English through print and traditionally, it has been "taught" to them. According to Peyton and Batson (1986), "most [deaf students] have little conception of English as a conversational 'living' language, a medium of real communication, for they rarely use it for that purpose" (p. 1).

ENFI is unique in that it allows deaf students to experience English more as a conversational, "living" language. When reading and writing on the network, students experience sequences of text created in a social context and used for a variety of purposes.

Immediate feedback, turn-taking, physical proximity, and other characteristics of conversational language are intrinsic parts of ENFI activities. Furthermore, network interactions replicate the scaffolding patterns found in natural language learning situations, where more proficient language users model, extend, and expand language for less proficient users (see the section on "Interactional scaffolding in network conversations" for discussion). In short, ENFI approximates many of the conditions associated with natural language learning.

Ken Goodman - What Makes Language Learning Hard, What Makes it Easy

Ken Goodman also talks about conditions for natural language learning by describing what makes language learning difficult and what makes it easy. Many of the conditions he describes as making language learning difficult are characteristic of traditional approaches to language arts instruction. For example, traditionally language has been taught from a "bottom-up" view of learning, which assumes that the "whole" of language is learned as a consequence of learning the smaller parts--letters, sounds, and phrases. Traditional approaches to instruction have also broken down language, from an adult perspective, into sequences of discrete skills, with little regard for how those skills might be put together. Instruction has also traditionally focused on the structure of the language, requiring students to analyze it, rather than to use it. Finally, language lessons have often consisted of uninteresting, irrelevant exercises that lack social interaction and fail to demonstrate real uses of the language.

Unfortunately, many deaf students have experienced English only through traditional classroom instruction typified by many of the conditions listed above. ENFI interactions, on the other hand, allow teachers and students to use English in the classroom in ways that make language easier to learn, according to Goodman. ENFI activities allow students to use English in ways that are real and natural, whole, sensible, interesting, and relevant. Discussions about personal experiences, books read, and new concepts take place in a social arena that belongs to the learners, as they raise topics, discuss ideas, and ask questions. Written English becomes the medium for making meaning, rather than the focus of instruction. The fact that English becomes accessible and useful to the students, as opposed to a subject to be learned in parts and analyzed, is an empowering experience. These same attributes appear to be reasons why ENFI activities are so highly motivating for students.

Frank Smith - The Reading Process

ENFI activities engage students in reading and writing. Network interactions also seem to foster in students the use of strategies that Smith describes as those used by fluent readers--active involvement with text, the use of redundancy, the willingness to take risks to reduce uncertainty. Smith explains that good readers actively apply background knowledge, reread, and make predictions as they process text. Good readers use redundancy in text, such as unfamiliar words repeated in different parts of a passage, to figure out meaning. Good readers also use the redundancy of explanations, examples, and definitions of words and concepts within the text. And finally, fluent readers take risks to reduce the uncertainty of unfamiliar texts. They make educated guesses at unfamiliar words and passage meanings based on background knowledge and their knowledge of cue systems--graphophonics, semantics, and syntax.

Network interactions seem to promote the use of these strategies in the collaborative development of written texts. Unlike complete, printed texts that students usually read, ENFI interactions require students to actively process written text as it is being created. It is possible for students to "read" through an entire book without fully comprehending it (particularly if teachers are not applying strategies to monitor comprehension during reading). But ENFI readers, on the other hand, are continuously held accountable for comprehension by the immediate responses they give to and receive from other participants. They must reread, and struggle to figure out meaning and make meaning, or their responses don't make sense, and communication breaks down.

ENFI interactions are littered with examples of language redundancy that support students' attempts to figure out and make meaning. The cohesion that occurs in conversational language--parts of utterances from one conversational partner used in the response of another conversational partner--add an element of redundancy that does not occur in already completed and published print texts. Also, skillful teachers can build redundancy into network interactions as they scaffold language for the students by explaining words, repeating and rephrasing questions, and providing examples of terms and concepts.

Risk taking, too, is frequent in network interactions. The social nature of ENFI interactions motivates students to attempt new words, spellings, and sentence constructions and to try out new ideas. It seems easier for some students to take risks on the network, which involves a more temporary form of writing, than to take these same risks on paper, a more permanent record of their efforts. Clearly, the rewards of immediate feedback on the network motivate students to set aside reservations about whether their writing attempts are marred by sentence-level errors, misspellings, or lack of punctuation. Also, teachers quickly discover that it is impossible to focus on letter-perfect writing on the network; the interactions proceed

too quickly. Students are more eager to attempt to communicate their thoughts and ideas when they realize they will not be penalized for minor errors.

Whole Language classrooms require that reading and writing be real reading and writing, and not exercises in reading and writing. Children need to read materials of significance to themselves and to write about experiences of importance in their lives if they are to succeed as readers and writers (Oxley, 1988). In Whole Language classrooms, children are encouraged to experiment with language and with reading and writing strategies in order to communicate with others (Clarke, 1987), and it is understood that errors are a natural part of learning. Based on our knowledge of Whole Language approaches and our experience with ENFI activities, these activities appear to facilitate implementation of the language arts program at Kendall School across ages and levels of development.

ENFI ACTIVITIES AT KENDALL

Joy Kreeft Peyton and Anne Marie Baer

During the past few years, many different ENFI activities have been developed at Kendall. We list them here, and then give a brief description of each with a sample transcript (student names have been changed, but otherwise the transcripts are reproduced as they were written). This list is by no means exhaustive, but gives an idea of the variety of things that can be done on the network. Teachers are encouraged to develop new activities or adapt these, in line with their goals, their curriculum, and their students.

Open-Ended Discussion

> Topics discussed include: Plans for the weekend or a holiday, TV shows, birthdays, rock groups, shopping, parties, favorite colors, the weather, news events, problems students are having.

Discuss a Reading Text
- Open-ended discussion
- Structured questions with beginning students
- A story is told in ASL and then students discuss it on the network

Discuss Math Concepts and Problems

Discuss Science Concepts and Vocabulary

Plan a Class Project or Event

Pose a Problem, Students Provide Solutions

Create Hypothetical Crisis Situations, Students Create Possible Resolutions

Write a Story Collaboratively

Focus on Aspects of English Structure
- Why questions
- Sentence expansion

Play Language Games

Open-Ended Discussion

Heather Jilao - 12-year-olds

Especially in the beginning stages of using the network, many teachers have open-ended discussions in which the students can discuss various topics, including weekend plans or activities, holidays and class parties, movies they have seen, or books they are reading. The teacher helps to guide the discussion with questions and extensions of student contributions, but also follows the students' lead.

These discussions, which can take place at any level of topic sophistication or linguistic complexity, give opportunities for students to work on focusing a topic, paying attention to what others have written and building on that, answering questions appropriately, giving enough information, and writing clearly so others can understand. At the same time, the teacher can model vocabulary, style, and language structure. When students become more familiar and proficient with the discussions, they can be given opportunities to lead them, taking the teacher's place or working along with the teacher.

This excerpt from one conversation comes from Heather Jilao's class in the SOP (Special Opportunities Program), for students who are functioning below their peers because of various factors--language, educational, or family background, or handicapping conditions in addition to deafness. The students whose writing is shown here are developing relatively beginning literacy skills.

Teacher Good Morning everyone!!!!!!!!!!!!!! You all look tired this morning. I am tired too.

Cathy so you were busy this weekend? What did you do?

Mary why didn't your sister come this weekend?

William now football is finished what will you talk about? What did you do this weekend?

Mary HEATHER GOOD . MY MOTHER I DON'T KNOW ... FRIDAY VERY SICK ME ...

Teacher Ali thank you for your homework. I saw "look who's Talking too" I thought it was funny. What else did you do this weekend.

Mary are you sick now? What's wrong?

Cathy	hello heather how are you feel ? okay i am feel little tired because i habve busy ... i need change my body can't change .. , i am not finshed to homework beacsuse i have busy from weekend i feel bad today.....
Teacher	What do you need to change on your body? CATHY
Cathy	i want change diffrerent and i need learing but i can't change my things .....
Mary	HEATHER GOOD , FRIDAY, SAT, SUNDAY VERY SICK MY MOTHER, SISTHER CRYSTAL GIVE MAKE SICK...
Teacher	Cathy so today you are not feeling so good about your body? Did the doctor in Conn call your mother ? Why are you feeling bad today?
William	on sat. moive'' run '' . father and brother . with moive .
Teacher	William so you saw the movie "Run" with your brother and father? That must be a good movie. Where did you see the movie? What is the movie about?
	Mary it sounds like everyone in your family is sick. Would you like to go to the nurse?

As the conversation continues, students add more and more detail to their topics.

Discuss a Reading Text

Open-ended Discussion of a Reading Text With Young Children
Babs Kaufmann - 9-year-old students

In this example, the class is discussing Chicken Little, which they have read together and discussed in ASL in class. A brief portion from the beginning of the discussion is shown here. We can see the teacher juggling the conversation among several students to:

- follow up and give prompts (to John--"What was the title of the filmstrip?")
- confirm student answers ("Yes, you are right. The title is "Chicken Little.")
- correct ("No, Tammy, your title is wrong. The title is "Chicken Little.")
- model ("acorn" after John has written "acoron")
- get more students involved ("Carol, do you know who Chicken Little is?")
- push for more details ("Yes, John, an acorn fell and hit Chicken Little's head. Where did the acorn come from?")
- move the story retelling along ("John, yes, the acorn fell from an oak tree. What did Chicken Little say?").

Teacher	Good morning class. Who remembers the story about a little chicken? Can someone tell me the title?
John	i not know and i fogth
Tammy	THE LITTLE CHICKEN to teacher
Teacher	John, do you remember the filmstrip? What was the title of the filmstrip?
Teacher	Tammy, your title is almost right. Try again.
John	chicken little
Jamie	Chicken Little

Robert	babs, you are wrong I'right "chicken little"
Teacher	Yes, you are right. The title is "Chicken Little." Now tell me what happened to Chicken Little?
Teacher	Robert, you are right. The title is "Chicken Little." What happened to Chicken Little?
John	when acoron hit chicken head
Tammy	Please i will remember LITTLE CHICKEN?? It right????
Teacher	Yes, John, an acorn fell and hit Chicken Little's head. Where did the acorn come from?
Teacher	No, Tammy, your title is wrong. The title is "Chicken Little."
Jamie	An oak tree
John	acorn tree
Teacher	Carol, do you know who Chicken Little is?
Tammy	Thank you to tell me you are right
Teacher	John, yes, the acorn fell from an oak tree. What did Chicken Little say?
Carol	MSR. Kau Fman the Chicken little it was fun?
Teacher	Carol, do you mean Chicken Little is funny?
John	sky is fall said chicken little
Teacher	John, yes, yes!! Chicken Little said, "The sky is falling!" Do you believe that?

From here, the class went on to discuss the other animals that Chicken Little warned, whom the group of animals went to see to warn that the sky was falling, whom they encountered on the way (the fox), and what happened to them. It is clear that some of the students (particularly John) understood and were able to write about the story much better than others, but everyone was able to participate to some extent in collaboratively retelling the story.

Discuss a Reading Text

Open-ended Discussion of a Reading Text With Advanced Students, High-Level Readers
Yetti Sinnreich - 13-year-olds

The class is discussing a poem that they had read on their own the day before. In this case, they had not discussed the poem in sign before this written discussion.

Teacher	Have all of you had an opportunity to read the poem by David Wagoner, "Staying Alive?" . . . Suppose you were lost in the woods, what would you do?
Greg	I Think the poem is boring and i forced myself to read it anyway.
Teacher	What do you think about the author's advice?
Greg	Get some food, water, and try to get some compass.
Roseann	How to survive.
Teacher	I'm glad you read it anyway, Greg. Can you answer my question?
Bessie	I shall eat something that is edible then try to find my way out eating to survive on the way, sort of camping all alone but without supplies or something.
Teacher	How would you do those things? . . .
Cheryl	I think it's good, but why not get a book on survival instead? It'd be alot clearer , too. . .
Cheryl	I mean the author's adcdvice
Greg	Try to find a way out and see if there s anybody that I can ask for the direction out. . . .
Bessie	Wilderness! no one around for miles!
Teacher	Good question, Cheryl. Can anyone guess at why the author wrote a poem instead of an essay? . . .

Roseann I would read the book of survival before i was on the trip. But what if it was unexpected trip like plane crashing in the top of the mountains.

Bessie I dunno, He might be a person who loved to write poems instead of sensible essay type statements.

Gary Because it will be better to write a poem instead of essay. Other reason may be because the story is short not long enough to write an essay. . . .

Discuss a Reading Text

Structured Questions With Beginning Readers and Writers
Dayna Brown - 13-year-olds

These students are in the SOP (Special Opportunities Program). Dayna brought in simple stories and essays which she read and signed with the students in class before going to the ENFI lab, where they discussed the story in writing. At the beginning of the year, this took place in a very structured fashion--Dayna asked a question, each student answered it, and then she asked another question.

In this example in November, they are discussing an essay they have read about whales.

Dayna Good Morning my wonderful students. What was the title of the story I read to you ?

Linda The singing whales

Ed Title is singing whales

Jane 'THE SINGING IS WHALES '.

Sarah The music whales.

Dayna The title of the story was The Singing Whales. Is your answer correct? What kind of story was it, non-fiction, fiction, or historical?

Sarah non-fiction

Ed

Jane	Fiction
Linda	The story is a non-fiction.
Ed	non Fiction
Dayna	The story is non-fiction. The scientist studied what kind of whales?
Jane	HB is whales.
Linda	The scientist studied a humpback whales.
Ed	The whales Hampback.
Jane	Hampback is whales.
Dayna	The answer is Humpback Whales. What was the name of the ocean that the scientist studied in?
Linda	atlanticocean
Ed	ahyhujmoing
Jane	Alnicoce.
Dayna	The name of the ocean was the ATLANTIC.
	We are finished.

Later in the year the readings became more advanced and although the question-answer structure was maintained, Dayna and the students made more complex contributions to the discussion.

In January, in conjunction with Martin Luther King's birthday, they are discussed an article they had read about him.

Dayna	YES! You are all correct. We also talked about segregation. This must of been a terrible time for people to live in. Places were segregated like Churches and Hospitals. What were some other places that were segregated?

Mike — 1 school and 2 doctor and 3 church and 4 hospital and 5 bus and 6 restaurant. we are they are segregated.

Sally — White poeple segregated and Black poeple and the churches.

Jane — BUS , RESTAIRANT SCHOOL AND WATER FOUNTCINS I SAY WHY BECAUSE TELL PEOPLE BLACK AND WHATE IS SEGREGATED DIFFERENT PLACES YES .

Linda — Whhite people segeratedsit onthe sat on bus then black people stand back ofthe bus.The white people segergated, the white people said "no" black people is sad about white people.

Dayna — I am so happy that Martin Luther King made our world a better place to live in. Black, white, Asian, Spanish, and Vietnameese can all go the same school and we can all be friends. We must help people to remember that all people are equal! We are finished talking about MLK now you can send a message to your friend. Have fun!

Sarah — Black and white poeople was seregation in hosopitals. White poeple out to black preson feel sad and hurt. They are go to another hospital. I have black friends.

Discuss a Reading Text

The story is told in ASL before the students go to the network
Marsha Morales and Anne Marie Baer - 13 & 14-year-olds

Anne Marie Baer, a native ASL signer, told the class Hans Christian Anderson's "The Tinderbox" in ASL, using the classic comic to show the class the pictures while signing the story. The following day the teacher, Marsha Morales, retold the story, again in ASL. The class discussed the story on the network the following two days, reconstructing it together. The example shows one small part of the discussion.

We found that the students' network writing in these two sessions, after an introduction in ASL, was much more complex and interesting than it had been in other sessions, in which they had not had such an introduction, and the students were much more motivated to write.

Teacher	A witch told this young woman who was a soldier about the tree and what was down at the bottom.
Lucy	then man want to more money and witch said "ok and come with me and follow me pls" then man ok and he walked with witch and then both ...
Teacher	What did the woman (witch) want the man to do?
Danny	to get the tinder box
Dirk	young boy said not have any money.
Joy	I dont remember story book but i like book yes.
Tom	CLIMB UP THE TREE TO GET HIM SOME MONEY AND GET HER MOTHER TINDER BOX
Marcie	Good story, dog name is Bull but man friend Bull and man is king can't marry pretty woman and pretty woman's parents angry no marry but man want love heart pretty woman but man idea want tell dog bull and dog run look under shsh see find pretty woman sleep bring run go to man house then man kissed pretty woman and bring back her house.

Discuss Math Concepts and Problems

Anne Sullivan - 13 & 14-year-olds

One teacher used the network to discuss math concepts that had been covered in class, in sign language. She felt that the students understood the concepts when they were expressed in sign, but they needed to understand and be able to express them in print as well. Her goals are in line with those of the National Council of Teachers of Mathematics, that students be able to write about math. This is particularly important for deaf students, who need to learn how to write about math in English.

In this example the class is working on writing number sentences and story problems. In the course of the discussion, Steven and Dennis show marked improvement in their ability to perform these tasks (each turn in the transcript is numbered and turn numbers are included here, to show where this conversation was extracted from the larger discussion that involved the whole class of eight students).

1	Teacher	Hi everyone! Well, I'm glad we are all on ENFI now! Please explain to me what a number sentence is.
11	Dennis	You tell me a example.
12	Cher	SUZANNE FAST TO WALK 30 MILES DENNIS FAST OR LESS 01 MILE FOR WALK.
13	Teacher	Cher gave an example of a story problem. What would be the number sentence for her problem?
14	Timothy	30-1=H or F or A
16	Dennis	30-1=z
17	Teacher	Dennis and Timothy are right!
33	Teacher	Let's say I have $10.00, and I want to buy a toy that costs $5.50. What would the number sentence be that will help me know how much money is left?
34	Steven	15.50
35	Teacher	Steven, what is the number sentence?
36	Steven	addd
37	Teacher	So you mean 10.00 + 5.50 = n?
38	Steven	I am forget
48	Dennis	10.00-5.50=z
49	Teacher	Dennis, that is excellent! Now I would like for YOU to make up a story problem.
59	Dennis	joe collect 500 football cards and mary collect 38 football cards how many more joe than mary?

63	Teacher	That is an excellent problem that Dennis wrote. Who can think of the number sentence for his problem?
67	Steven	500-38=n
71	Teacher	Steven and Harvey and Cher are right!

Discuss Science Concepts and Vocabulary

12-year-olds

The class is reviewing a lesson they have just finished, with a movie, on the lungs. In this conversation, the students have the opportunity to review and use the words ("bad aid and good aid") and concepts ("We look at the bollon in the body") they have been reading about and seeing in the movie, and to restate what they know (Elaine's account at the end). They receive continual feedback ("Wow! that's a thought Burt. I would worry too if my lungs were near my throat"), correction ("Okay, Pam that's good you got it but it is not AID it is AIR"), and extension ("Are you sure that you saw a balloon? Do we have ballons in our bodies?") not only from the teacher, but from the other students as well (Ernie clarifies that "the bollon in the body two lung").

Tom	right pam you do is watch very good i am worry if lung was in up and near thort.
Teacher	No one has told me about the other movie yet. Does any one remember. This is a hint. The lungs and the other part work very close together to help our bodies function to the best of its ability. Who knows the other part?
Tom	We look at the bollon in the body
Burt	My favrteion is "dolly".
Teacher	Wow! that's a thought Burt. I would worry too if my lungs were near my throat. Why would you worry?
Burt	Tom understand what co2 o2 in movie now
Teacher	Are you sure that you saw a balloon? Do we have ballons in our bodies?

Tom Burt what you said

Burt no balloon in my bodie.

Pam Bad aid and good aid...

Ernie the bollon in the body two lung.

Teacher That's a good question. What does co2 and o2 mean? and do you remember what h2o means?

Pam that mean water ..

Burt pam you did better not makeup about aid we not see aid in movies.

Teacher Okay, Pam that's good you got it but it is not AID it is AIR. . .

Elaine Well today we will talk about the "LUNGS" and how we brethe or go to sleep and wwe brethe that way and we swim in the cold water in the pool anmd some people die when they can't brethe. So today we have to talk about the "THE LUNGS AND THEBALL LUNGS" today. this is good ffor you to know to learn how to get samrt to knowing of it. CO2 mean that not goood air

Plan a Class Project or Event

Babs Kaufman - 9-year-olds

In this network session, the class is planning their Christmas party, and the teacher has offered to bring the cupcakes. The following excerpt about the decorations for the cupcakes comes from the second half of the discussion and is extracted from other contributions about who will bring what to the party.

This discussion gives the students opportunities to use appropriate vocabulary, to negotiate plans and meanings, to respond to challenges and queries, and to narrow down what they will do, in the context of an actual event that they are eager to participate in.

Teacher Robert, what color of frosting do you suggest we use for the cupcakes?

John red and white frosting! babs

Robert	babs, white and green and red
Teacher	John, do you want a red tree and white frosting on the cupcakes????
John	yes babs
Teacher	John, you really want to frost the tree with red frosting?
John	red frosting line on the tree babs
Teacher	Robert, your suggestion of white, green and red frosting is a good idea. What should be green? What should be red? What should be white?
Teacher	John, I understand you now. You want to make red tinsel on the tree with red frosting. That is a good idea. What color do you want the tree to be? White?
Robert	babs, white is snow green is tree red is hang ball
Teacher	Robert, that is a good idea to use white frosting for snow and green for the tree. John suggested we use red frosting for tinsel. For christmas balls, how about some M & Ms?
Robert	babs, I think M & M is too big
John	robert no m & m are not big small ball
Teacher	Robert, you may be right. Maybe we can use cookie and cake decorations such as colorful sprinkles or silver balls and red hots???

Pose a Problem, and Students Provide Solutions

Leslie Brewer and Barbara Hunt - 12- to 15-year-olds

Leslie Brewer wanted her students in the SOP (Special Opportunities Program) to develop their problem-solving skills so they could function effectively at home, at school, and in their community. She wanted the students to recognize and understand a problem statement when it was presented in sign language and in writing, to be able to state a problem clearly themselves, propose clear and reasonable solutions, react appropriately to what others wrote,

and expand on what they and others had written. She also wanted them to relate what they wrote on the network with other reading texts that had problems and solutions.

The class met on the network for one 45-minute session each week with a 20-minute preparation session (in sign language) and a 25-minute follow-up session for revising and editing what had been written on the network. Leslie and the classroom aide, Barbara Hunt, presented a problem to the class--one they had observed among the students or one that a student brought in. Barbara signed the problem in ASL, and then Leslie signed it in signed English. The students, in sign, restated the problem and proposed solutions. Then the class went to the computer lab, and Leslie or Barbara wrote the problem on the network, and the students proposed solutions in writing.

Eventually, students began to write their own problems on the network for the other students to solve. Here is a list of the various problems that were discussed throughout the year and an excerpt from one of the problem solving sessions.

Problems Presented for Students to Solve

9-27-90
Your mother sent you to the store to buy milk. She wants chocolate milk. You looked and can't find it. You will have to ask for help. The sales clerk is hearing. How will you ask for help?

Your family is having dinner at your grandparent's house. Everyone is dressed in their best clothes. There is lots of food on the table. You are sitting next to your grandmother at the table. She is deaf, too. You want to ask for more turkey. How will you get her attention?

You are playing outside at Recess. You see a friend stuck at the top of the slide. Your teacher is watching the other side of the playground. She is deaf and does not hear him yelling. Please get your teacher's attention.

10-4-90
You are at the school library. You can't find the book you want. You must ask the Librarian for help. What questions will you ask?

You are having trouble reading the directions for your science project. Your teacher is ready to help. What questions can you ask?

You are watching T.V. at a friend's house. The program started before you and your friend got there. Now the commercial is on. Ask your friend's father what happened. Ask him many questions.

10-11-90
You are at school. You feel sick. You go to the nurse's office. Tell the nurse what hurts. Ask the nurse what to do.

11-5-90
You go to New York City for the first time with your family. Your family has never been to New York City before. You want to go to a nice restaurant to eat. Who would you ask for information?

11-19-90
(Actual situation)
You will have friends over for Thanksgiving dinner. What time will you serve dinner? Who will you invite? What will you eat? What will you talk about at the dinner table? Will you enjoy yourself or will you feel depressed?

1-28-91
(Actual situation that happened to one student)
Someone asks you to borrow your computer game and you say, "OK, keep it for one week and return it." The person does not give your game back. They tell you if you tell your teacher or your parents they will beat you up. How can you solve the problem? List possible solutions.

2-4-91
Good Morning, How are you today? I hope none of you are angry. today we will discuss the feeling of anger. Is it ok to become angry? I don't like to become angry but sometimes it happens.

Vincent . . . Do you sometimes become angry?

Jane, what happens at home that makes you angry?

Jessica often times you come to school angry. What happens at home that makes you angry.

Sally, what happens at home that makes you angry? I can think of many things that make you angry. Please list a few of those things.

Sarah, I am so sorry that your mother became angry. Maybe you did something wrong. What did you do that made your mother mad? What did your father say?

2-25-91
Good Morning class to day we will discuss death and how we feel when a person dies that we know. How do you feel when a person dies?

This week on t.v. I saw where a young girl had died and I thought about a friend of mine who died when she was sixteen years old. I felt very sad and wished I could make her live again but we know this is not possible.

Now all of you remember the question. How do you feel when a person dies? Some people feel happy when a person dies, because maybe the person had been sick for a long time. Do you know anyone who has died?

3-4-91
(Sally's problem) I have a problem with christina last two week I went over sleep christina's house but I forget my T-shirt "Bart Simpson" and white pant i just called her on tdd, christina's father told her return my clothes than i told her many time she always forget to bring my clothes.

(Linda's problem) Last friday, Vincent always pick on me and he always in my busseins. Vincent told Heather [another teacher] that last week on wed I have my current news SO, I was at lunch and I saw Vincent always tell his friends about me then Vincent's friend started to pick on me every yaers.

3-18-91
How many times do you go to the dentist each year? One boy in my class has never been to a dentist. He is afraid to go. He thinks the dentist hurts people. I told him that I like my dentist. What would you tell him?

4-22-91
We have a new kid in our class. He moved here from another country. He doesn't sign like most of us. He wears different clothes. He brings different food for lunch. Yesterday in the lunchroom some kids were making fun of the new kid. They wouldn't let him sit with

us. I like him. I'd really like him to sit with me. I like to watch him sign. But, if I stick up for the new kid maybe my other friends won't like me. What should I do?

4-29-91
There was a spelling test with very hard words. A boy in the class wrote some of the words on his hand, and the teacher saw it when he was tying his shoelace. She said he was cheating. The boy said that he did study, but he gets nervous in tests and didn't want to forget the words. How should he get ready for tests? What can he do so he doesn't cheat?

Discussion of One of the Problems

Teacher	There was a spelling test with very hard words. A boy in the class wrote some of the words on his hand, and the teacher saw it when he was tying his shoelace. She said he was cheating. The boy said that he did study, but he gets nervous in tests and didn't want to forget the words. How should he get ready for tests? What can he do so he doesn't cheat?
Linda	He need to review his work,prctice and studing the words until he remeber.
Jessica	The boy's parent can teach to him how to learn spelling words and He won't be nervous when He got A's
Sally	I help him to do homework for study spelling words or he try to ask his parents for help.
Sarah	I can share with him to do hoework for study spelling words or explain about spelling words. Quiz on firday.
Sally	he ask your friend will help at him . your friend will taugth about hes' homework . he go to over yourfriend s' house he work study with your friend for homework.

Create a Hypothetical Crisis Situation, Students Give Possible Resolutions

Anne Marie Baer and Babs Kaufman - 9-year-olds

One teacher started using the network with relatively young students, who had not used computers before. After several weeks as a whole class on the network, the students felt insecure about their writing and became frustrated, and the class decided to take a break from ENFI.

However, two students were interested in continuing, so the ENFI Project's Research Assistant, Anne Marie Baer, took those two to the ENFI lab once a week during Language Arts. She presented them with hypothetical crisis situations, using Indiana Jones-type adventures as a general theme, to which they were to find a solution. At first the students had difficulty understanding the situations and providing relevant solutions, but gradually they began to provide appropriate responses to the crises. When Anne Marie had them discuss their strategies for addressing the situations in sign language off the network before writing them, they began to collaborate well with her and each other in formulating their solutions.

The following excerpt, after the group of 3 had worked together for about 2 months, shows how well the students worked with each other and Anne Marie, building on each others' ideas and vocabulary.

Teacher	Good morning Indy and Mary! [2 characters in the Indiana Jones movies] Now you are both in the plane on the lake about 100 miles from Florida. . . . [In the previous session, their plane, headed for Florida, had had engine failure and landed on a lake.] An alligator is approaching. Indy's gun went to the bottom of the water. [Indy had said in the previous session that he had a gun.]
Mary	I will bring my some few food then I will give to an alligator.
Indy	Mary will throw meal to alligator then i swimmingto ground
Mary	Tooo me fast swiminng ...
Teacher	Now you both are swimming in the lake. The shore is a little far away. You both start to feel very tired and your clothings are getting very heavy. You both may not be able to reach the shore...

Indy helicoptor come to low near water

Mary helicopter coming to pick up to us go to florida and we will be very safe...

Teacher The guys who rescued you told you that they're taking you to Florida but you notice the helicoptor is going north instead going south to Florida...

Indy i hit to man off from helicopter then i drive the helicopter

Mary I'll watch to him...

Teacher Now you both are going back to Florida and World Disneyland! Have a good time!

In April, Babs, the teacher, decided to have the whole class return to the lab for ENFI. In their first session, the two students and Anne Marie modeled for the others what they had been doing together. The following transcript was the result.

Teacher . . . Now you both are in the jungle and you see the swamp. The bridge is very weak and loose but you have to go across.

Mary I swming through to arrive there.

Indy i sling to alligator swimmer away i swin to ground

Teacher Now you both finally reach the other end and are hiking in the jungle. All of the sudden Tammy fell into the quicksand. She is a little out of your reach.

Mary I try hard to reach.

Indy I sling to mary s hand out of quicksand

Teacher Indy has rescued Mary! Now you both see someone hiding behind a bush. You both think that person is a tribal man.

Indy i see how mary strong woman!

Mary I take a think wood then I fool to him I talking then I hit with my wood in his head then I and Indy run around. I mean thick.

Anne Marie's field notes for that day describe the rich off-network collaboration that occurred as the students wrote and the excitement that the activity generated among the other class members:

> Everyone watched while Jamie and Tammy discussed their solutions in ASL and then typed them. I tried to use challenging vocabulary so they would ask me about it and discuss with each other. Jamie asked me about "swamp" and "tribal." Tammy asked about "hiking," "quicksand," and "sling," and if "bush" meant President Bush.
>
> The other students tried to participate in the discussion, and everyone started signing to each other. Tim got upset because he couldn't participate, and kept saying that he could easily do that.

The class that had been insecure and frustrated was now clamoring for a chance to participate. Babs and Anne Marie decided that in the next ENFI session, the whole class would be on the network, working in groups of three (two students and a teacher). There would be a preparation time, when they would hand out papers with various crisis situations to be discussed and related new vocabulary. (One of these preparation sheets is attached.) This way, each group would work on the same tasks, but could do with them what they wished.

The success of this activity seems linked to the following features:

- An exciting theme was introduced, that the students were interested in, knew about, and were motivated to write about. The process they used with Indiana Jones adventures could easily be applied to other themes and topics as well.

- Small groups of students (usually two or three) worked together on the network with a teacher or teacher aide, who described the crises, gave vocabulary and other assistance when needed off the network in sign language, summarized what the students wrote, and kept the activity moving.

- Two students became very proficient at this activity, working on it for a couple of months and then modeling it for the other students in the class, who then worked in small groups on separate channels.

- Students signed their solutions with each other before writing, so they worked collaboratively.

- Handouts were used on which possible crisis situations were described and new vocabulary given.

ENFI PREPARATION SHEET

Theme: Indiana Jones

Characters: Indy, Mary, Alex, inside a cave hunting for a big gem.

Crisis #1. You all need to reach the other side but there is no bridge or water and the bottom is all the way down out of your sight.

Crisis #2. While walking, an earthquake came. Alex accidently slipped into a trough (other possible word?) out of your reach.

Crisis #3. When you all found a small shrine where the gem is hidden, you got locked out. The heavy rock rolled and sealed the tunnel where you came in from.

Crisis #4. You found the gem and are ready to go out but the tunnel collapsed. You saw the blue sky through a small opening up on the ceiling. The ceiling is very very high and (has many icicles?)

Vocabulary: out of your sight, earthquake, out of your reach, accidently, shrine, gem, seal, tunnel, collapse, ceiling, opening

Write a Story Collaboratively

JoAnn Mackinson - 9-year-olds

These three students, who had a relatively high level of English language proficiency, had been writing on the network for about six months when they wrote this story together, without teacher involvement. They took turns, each building on the contribution of the previous student (only the first part of the story is shown). There is a lot of creativity evident here, including the use of punctuation and repeated vowels and consonants for effect. As in the other activities described, there are also opportunities for language modeling, this time by the students--for example, Marcie's explanation for Anna of the difference between "mare" and "nightmare," and of the meaning of "imagination."

Marcie	hello. let start our topic is "coming into my night mare" Once upon a time there was a boy named Tom he went to sleep he had night mare he . . .
Anna	what mare mean is?
Robin	it means a bad dream.
Marcie	she is right
Anna	oh i see. his mare is about an vamprie. a vamprie want to eat he. he not want the vamprie to eat he.
Robin	he ran into a house that is haunted and he was in. The door slammed.
Marcie	he started to be afraid he had alot imagion that mean he think what shall hapeen then he thought he was at the movies with alot of door that slammed. There is other mean to mare is a female horse night mare mean bad dreams
Anna	but he saw many vamprie. then he thought it is a false vampries. but it is real vampries!!!!!!!
Robin	he ran and run and fainted
Marcie	then he woke up with blood on neck and say "ohhhhhh vvaammppiirree hhaadd bitt me" do you understood me?
Anna	then he ran to his mom but when he saw his mom and his mom is deid!!

Focus on Aspects of English Structure

Why Questions
Babs Kaufman - 9-year-olds

The class is working on asking and answering why questions. Students both ask and answer questions and interact with each other, and the participation of the teacher and teacher aide (Pam) seems to add interest (especially the opportunity to ask the aide questions), and provides a model of questions and answers.

Teacher	Good morning class. Today, we will work on "why" questions. Be sure to answer all the questions the class asks you. I will start with Tammy. Tammy, why did your father go to Puerto Rico?
Robert	jamie.w. Why are you not finish homework??
Tammy	Mrs. Kaufman, my father went to Puerto Rico because my father want to see their family.
Tammy	Ryan, why your car is messed?
Pam	Carol, Why do you like to dance?
Carol	Pam, why are you shy in our class?
Jamie	Robert because I did not see the homework in my bag
Robert	yes my car is messed because my car is accient one week ago tammy.
Pam	Carol, you have asked me a hard question. I am shy in your class because I do not know all of you yet. When I get to know you better I will open up more. Is there anything else you wold like to know?

Focus on Aspects of English Structure

Sentence Expansion with Advanced Students
Yetti Sinnreich - 13-year-olds

The teacher presents a simple sentence and has the students expand it with adjectives, adverbs, and prepositional phrases. In this example, the students are proficient English users, and we see them playing off each others' ideas to develop more and more complex constructions.

Teacher	Good afternoon everyone. I'd like to spent a short time, about 20 minutes, working on expanding sentences. I will give you a short, uninteresting sentence which you will expand into a fascinating literary masterpiece. Ready? Here goes: The boy walked.
Shari	The white boy walked to nearby mall.
Cheryl	boy slouched as he walked
Bessie	The messy boy slumped and dragged his feet as he walked down the busy district.
Greg	The ugly boy with rich clothing walked quickly to the store.
Gary	The strange lookin' boy walked.
Cheryl	The hunchback boy slouched as we walked unsteadily to the styore. . . .
Shari	The ugly looking white boy limped towards the busy district where he wanted to go to a store there . . .
Cheryl	The conceited boy grinned with a macho smile to the adoring crowd of girls gathered around him.
Bessie	The rich and goodlooking walked proudly to a busy district where he was run over by a red mercedes. . . .
Shari	The rich spoiled boy walked very slowly, pushing girls out of his way. He jumped in the nearest sports car and drove of in the sunest.

Cheryl — The unconfident male didnot make eye contact with anybdy as he slouched to the mall.

Greg — And that car was a vw. buggy, shari.
a 1657 vw.

Bessie — A ugly boy with a crooked teech grinned to every girl he saw and acted very macho as he walked to a bank unfortunaely that time was a holdup going on.

Greg — I mean 1957. . . .

Gary — The little ugly strange lookin' boy walked limpy to the store and he drove a lamborgini back home but unfortunately he got a car accident and his limpy lamborghini is in the junkyard. But luckly Gary Smith went to the junkyard and bought lamborghini for 50 cents and fix it to new lamborgini and its right at my house! . . .

Focus on Aspects of English Structure

Sentence Expansion with Basic Writers
Yetti Sinnreich - 12-year-olds

Here the teacher is doing the same exercise with more basic writers. These two examples show that students can do this activity at many different levels. The teacher simply adapts her presentation of it, providing more explanations and prompts, and the students produce expansions at their level of English proficiency.

Teacher — Today as I told you yesterday I want to work on making sentences more interesting or expanding sentences. . .

Teacher — Sometimes we write sentences that can be more interesting.

For example:

The boy walked.

Is that an interesting and exciting sentence? . . .

Teacher Do you like that sentence?

The boy walked. . . .

Darren No

Robin No . . .

Gene No

Teacher Right Darren and Robin it is a boring sentence.

It is not interesting. . . .

Teacher Can we add words to that sentence to make it more interesting?

The _____ boy walked _____. . . .

Sally The lazy boy walked to store . . .

Ariel The tall boy walked home. . . .

Teacher Anyone else have different ideas?

Gene The fat boy walking to the school.

Darren The fat boy walked to the beach.

Don the thin boy walked to school

Robin The short boy walked to the swimming pool.

Ralph The skinny boy walk to school.

Teacher Excellent! Can you add an adverb to tell me how he walked? .

(Later in the lesson.)

Sally The good girl ran slowly to go to Wild World.

Teacher	Sally, you've got the idea!
	Anyone else?
Gene	The beautiful girl ran suddenly the outside track
Robin	The medium girl ran quickly to the metro bus . . .
Sally	The bad girl ran slowly to go to Pizza's hut. . . .
Darren	The beautiful girl ran suddenly in school. . . .

Language Games

Many different kinds of language games can be played on the network. Some of those shown here were initiated by students, when they were left to work in groups without a teacher involved.

Word Level

All the words you can think of that start with a, etc.

All the words you can think of that end with a

Aspects of American culture/deaf culture that start with a

All the things in the picture that _____

Write a word that starts with the last letter of the preceding word (the 8-year-old students in JoAnn Mackinson's class initiated this game, unprompted).

bear
red
dress
silly
yellow, etc.

Sentence Level

20 Questions - One student thinks of a person, place, or thing, and the others ask yes/no questions until they discover who or what the student has in mind. This game can be used to develop students' proficiency with asking and answering yes/no questions and their ability to narrow down possibilities based on information they collect.

Work with blocks of different colors and shapes. One student creates a design with his or her blocks, describes the design in writing on the network, and the other student tries to replicate the design.

> I have blue and red (working with only colors)
>
> I have a blue square and a red circle (working with colors and shapes)
>
> There's a blue square on the top left; to the right of that is a red circle; to the right of that, an orange rectangle. Below the blue square is a _____; etc. (This can get as complicated as the teacher and students want it to.)

FACTORS THAT CAN INFLUENCE THE QUALITY OF NETWORK DISCOURSE

Joy Kreeft Peyton and Martha French

Like signed or spoken interaction in the classroom, using a computer network to interact in writing does not constitute one approach, activity, or teaching strategy. Instead, it is a mode of communication that is shaped by the social contexts in which it occurs. We found the following aspects of the social context to influence the interaction that occurred on the network.

The Number of Participants Involved

When only two students or one student and the teacher interact on the network, in pairs on separate channels, they naturally take turns sending messages and waiting for each other to finish typing, so there is usually topic coherence, and contributions are tied to each other. Questions are followed immediately by answers, and statements are followed by related statements.

One such conversation between two students was shown earlier, in the section on "ENFI in the classroom." The following conversation (part of a longer one) took place between an eight-year-old student and her teacher. (In this and all examples, ellipses show where whole or parts of turns have been omitted. In particularly long transcripts, the turns are numbered.)

Teacher — Good morning! How are you? Easter is coming in a few weeks. What will your family do on Easter? My husband and I plan to see my family and we all might will eat out for a change. Will the school be closed during Easter time? I mean close on the following Monday after Easter Sunday?

Tammy — Good morning! I am fine.Yes easter will coming as few weeks.I not know what my mom've always secret what about present.... Ohh I see you will be fun int here.. Yes,I will not be there school..

Teacher — How long will you stay out of school? My husband is Jewish and we will also have a Passover celebration. Do you know what is Passover?

Tammy — Iam not know how many I out of there school..What mean Passover celebration?????

Teacher — Passover is a part of Jewish religion and tradition. Jewish families and friends get together for two nights. We all eat special foods and read and sing together to remember the days when moses freed Jewish people from Egypt and slavery about 5,000 years ago. Jewish people were slaves for many many

years until moses lead them out of Egypt through the Red sea. Have you seen the movie about Moses and the Ten Commandments before?

Tammy No I never see that..

Teacher You'll see that movie sometime later. That movie always come back on television during Easter time.

Tammy Maybe I will see that on later..What you want to talk?????

Another example is from a conversation between the same teacher and two students, developing an Indiana Jones-type adventure together (one student has logged onto the computer with the name "Indy").

Teacher Good Morning Indy and Tammy! Now you both are in the jungle and you see the swamp. The bridge is very weak and loose but you have to go across.

Tammy I swming through to arrive there.

Indy I sling to alligator swimmer away i swim to ground

Teacher Now you both finally reach the other end and are hiking in the jungle. All of the sudden Tammy fell into the quicksand. She is a little out of your reach.

Tammy I try hard to reach.

Indy i sling to tammy s hand out of quicksand

Teacher Indy has rescued Tammy! Now you both see someone hiding behind a bush. You both think that person is a tribal man.

Indy isee how tammy strong woman!

Tammy I take a think wood then I fool to him I talking then I hit with my wood his head then I and Indy run around.

Tammy Oh I mean thick.

Teacher That's good for today! We will have more adventures on next Wednesday. Have a good week! 8-)

In each of these examples we see the patterns and cohesion and coherence described above. A different pattern appears when more than two or three people communicate on the network at the same time (unless the teacher establishes a pattern preventing it, such as asking a question and requesting that each student respond in turn). The interactions are not so orderly. More than one topic may be discussed at a time, new topics may be introduced while old topics are still being discussed, topics may be dropped before completion, and conversational pairs such as questions and answers or statements and replies often do not appear together in the scrolling conversation. Since ENFI classes at Kendall tend to range from three to eight students, these patterns are always evident, and are intensified as the number of participants increases.

For example, the following is an excerpt from a discussion of the poem "Staying Alive" by David Wagoner, involving a teacher and five students, 13-14 years old.

85	Teacher	Suppose you were lost in the woods, what would you do?
86	Greg	I Think the poem is boring and i forced myself to read it anyway.
87	Teacher	What do you think about the author's advice?
88	Greg	Get some food, water, and try to get some compass.
89	Roseann	How to survive.
90	Teacher	I'm glad you read it anyway, Greg. Can you answer my question?
91	Bessie	I shall eat something that is edible then try to find my way out eating to survive on the way, sort of camping all alone but without supplies or something.
92	Teacher	How would you do those things? . . .
94	Cheryl	I think it's good, but why not get a book on survival instead? It'd be alot clearer , too. . .
96	Cheryl	I mean the author's adcdvice
97	Greg	Try to find a way out and see if there s anybody that I can ask for the direction out. . . .

99	Bessie	Wilderness! no one around for miles!
100	Teacher	Good question, Cheryl. Can anyone guess at why the author wrote a poem instead of an essay? . . .
103	Roseann	I would read the book of survival before i was on the trip. But what if it was unexpected trip like plane crashing in the top of the mountains.
104	Bessie	I dunno, He might be a person who loved to write poems instead of sensible essay type statements.
105	Gary	Because it will be better to write a poem instead of essay. Other reason may be because the story is short not long enough to write an essay. . . .

Since the teacher asked two different questions (in turns 85 and 87), the students answered both of them at the same time. In turn 88, Greg answered the question about what he would do if he were lost in the woods. In turn 89, Roseann answered the question about the author's advice. At the same time, Greg's response in turn 86 was to a question the teacher had asked earlier about what the students thought of the poem.

This transcript excerpt shows the discussion of only two topics for ease of reading. In fact, as Figure 3 shows, four different topics were discussed from turns 85 to 105. Figure 3 shows in schematic form how these various topic threads were introduced, dropped, and overlapped in this network discussion, and how participants contributed to more than one topic thread. For example, we see that Cheryl (CH) wrote about what she would do if she were lost in the woods and what she thought of the author's advice, and she also introduced the question (topic #4) of why the author wrote a poem rather than a book. In order to make sense of the transcript of such interactions, the reader must find and follow the different topic threads.

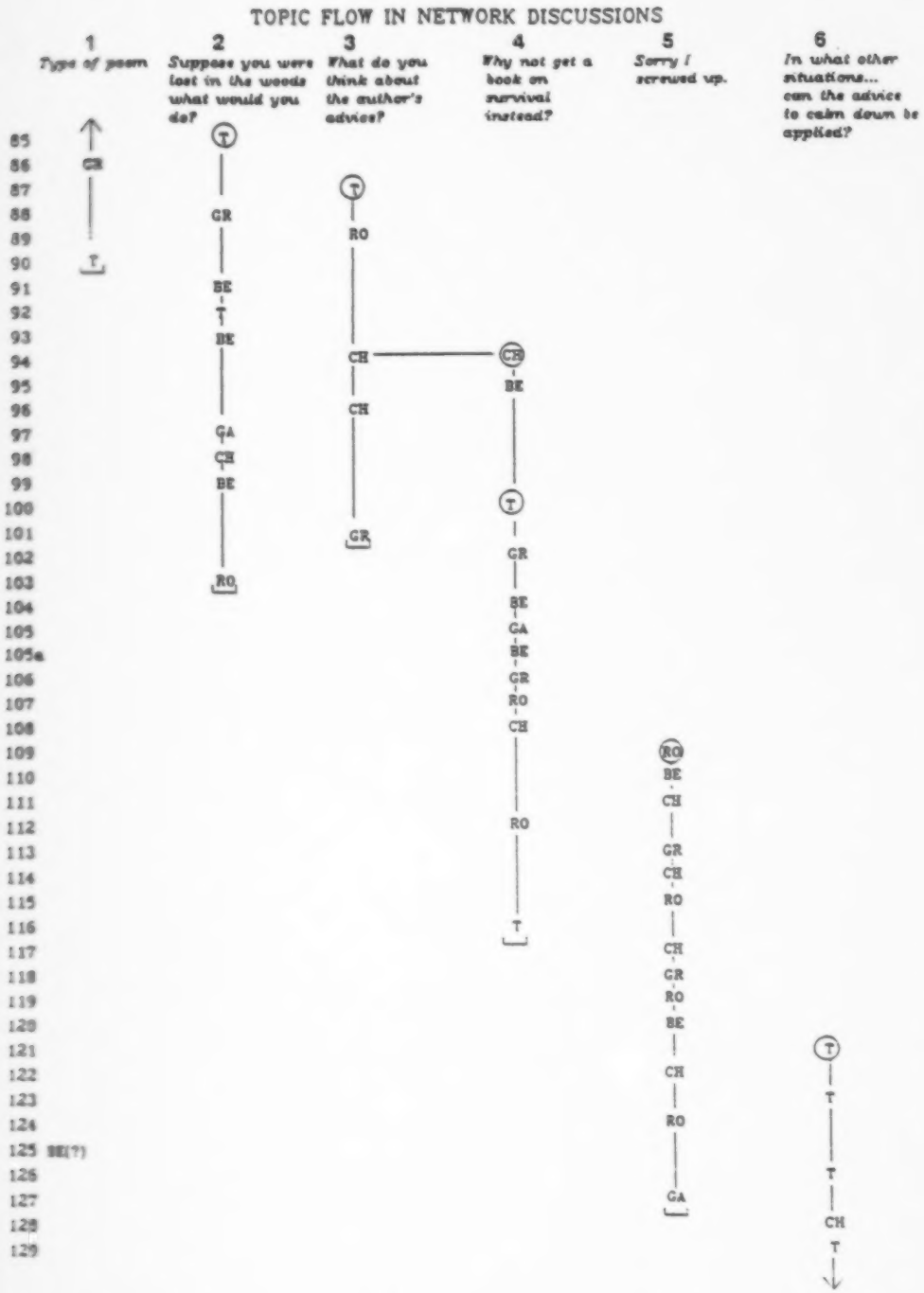


Figure 3

BEST COPY AVAILABLE

The Topic for Discussion

Another factor that makes a difference is the topic discussed. When the teacher or a student formally announces a topic, the chances that all participants will attend to and continue the topic tend to be greater than when topics evolve freely. It appears that the chance of achieving topic focus is even higher if the topic is a focused, academic one, like "Today we are going to discuss the poem 'Staying Alive,'" than when the topic is more open-ended and personal, like "What did you do last weekend?" where all participants, including the person suggesting the topic, seem to feel free to write about whatever they choose.

The following examples come from a class of 13-year-old students in the Special Opportunities Program (SOP; students who have handicapping conditions in addition to deafness). The first is an open-ended discussion about the weekend and preparations for Christmas.

Vincent	Hello everythink monoring!!
Linda	Hi Sarah, How are you? Are you ready for christmas? Will you open the present on mas-x?
Mike	Dear Everyone Good morning to everyone how are you ? I am fine. I will gift present to teacher and my friends for christmas.
Jane	GOOD monring to vincent.
Sarah	Hello everyone, How are you doing? I am doing fine.
Teacher	How is everyone today?? Did you all have a good weekend?
Vincent	Hello Jane monoring how are you?
Jessica	Hi Everyone Listen I can't wait unit on Christmas.
Linda	To:vincent, good morning vietnam that name of the movie!
Mike	Dear teacher i am wonderful nice weekend. yesterday i make a cookie for this friday christmas party.
Jane	HI Vincent, I am fine ok

Teacher	Jessica, Do you have a problem? How was your week-end? Did you go to dinner or just stay home and decorate your house for xmas?
Sarah	Too me can't wait and open for x-mas on christmas!
Vincent	Yes Jane too I am fine good for you ok
Linda	MS. Leslie [the teacher], Will you get all of us a present on friday?
Teacher	Sarah, what do you want for xmas? Do you believe in Santa Claus?
Mike	Dear Linda went you real a gymathnas vs than girl ?
Vincent	Yes why you ask name about vietum to Linda. . . .

The discussion ranged from the weekend, to Christmas presents and parties, to the movie "Good morning, Vietnam."

In the second example from the same class, the teacher asked a specific question about a news item. After opening greetings, the students all addressed the question.

Vincent	Hello anyevery morning , HOW ARE YOU????? ask me?
Sarah	Hello everyone! How are ya?? I am fine alright!
Mike	Good morning to vincent and sarah and jessica i am fine to vincent how are you?
Sally	hello everone morning , i am fine ! ok.
Linda	Hello everyone ,How are you?
Vincent	Hello Sarah , yes allright and I am fine too !
Teacher	Good morning class how is everything? I hope we will have a good class today. I saw on 60 minutes that the war is still going on in Iraq. Now there is oil in the gulf and many birds and fish will die. I hope this war will end soon. How are you feeling this week?
Vincent	Yes Mike , I am fine too !

Sally	VINCENT , iam fine and tired , I watch the babby sitting everday.
Jessica	Hi Everyone, I am fine.
Sarah	Hello Vincent, What do you think about still war in Iraq? Birds and fish will die from oil in gulf.
Vincent	Hello Teacher , yes i watch some on tv find news all yes i see on tv on oceae water oil !
. . .	
Mike	Dear Leslie i not watch 60 minutes i hate to 60 minutes i like to watch a super bowl football yesterday . i real sad to fish and bird real died.
Jessica	Yes Mrs . Brewer, I saw on news that the war. some more birds and fishs invited to all outside?
Sally	hello, leslie , I am fell ok and I ask to you about you saw on t.v war . and Iam real sad fish and birds was died. 60 minutes.
Sarah	Teacher, I watch on tv this morning, news say that Iraqis will became sick and hungry about water but can't drink. . . .

This is not to say that teachers should necessarily control all network discussions by proposing topics. But they <u>should</u> be aware that unless a topic is proposed by someone, and everyone agrees to contribute to that topic, the discussion <u>may</u> range from one topic to another in a rather unfocused fashion.

The Teacher's Presence on the Network and Shaping of the Discussion

The teacher's role in network writing is very important. Some teachers pair students for conversations with each other and so do not actually write on the network with them. If they carefully lay out the network task ahead of time (specifying, for example that students should open the conversation with a greeting, pick a topic together and stick to it, and close the conversation), interact with students in sign language while they work, and review the transcripts in class to discuss the qualities of good network interactions, the conversations can be focused and productive (see discussion and examples in Peyton & Mackinson, 1989). However, when no direction is given for the discussion and the teacher does not interact on the network with the students, network interactions can gradually degenerate into shared insults or discussion of topics such as who loves or hates whom.

For example, the discussion of the poem "Staying alive," above, initially seems somewhat confusing because of the multiple simultaneous topics, but when the various topic threads are followed, we can see that the students are participating in a coherent discussion in which they continue topics and build on each others' comments. They also use relatively complex language, including hypotheticals ("I [would] eat something that is edible . . .") and clause embeddings (". . . try to find my way out eating to survive on the way . . .").

In contrast, the following transcript was produced by the same students when the teacher was not present on the network, and wasn't even in the lab. She had sent them to the network to work together. The conversation focuses on loves, hates, and personalities and does not show the complex language that these students showed they are capable of in the other discussion.

Tom	Greg, congrats with JUDY!!!!!
Sharon	Well, Roseann may not like Tom.
Greg	h h h h h h h h

Bessie	So? Tom, that's old news!
Amy	Greg and Judy.
Roseann	I wont sharon and gary does not have to date forget it! But you dont know what you aremissing!
Sharon	what s old news
Tom	BESSIE what you talk about that old news ???!!!
Gary	GREG N JUDY GRAY
	TOM AND ROBIN WHITE
Amy	No, make your decision a good one, Rosi.
Greg	You are old fashioned, Bessie so.. Tom is trying to speak in your language... Bessie
Sharon	Yes, I agree with Amy.
Bessie	That gary and you loves each others and greg loves judy,
Roseann	NO WAY JOSE! . . .
Roseann	ggg . . .
Roseann	g ghg
Amy	ghndklrfuj
Rosi	gg g g g
Amy	hh
Rosi	g

Amy	hhh hh
Rosi	g
Sharon	Thanks Amy. Hey what s happening in interedimate
Tom	SHARON sis yes there will be a wedding !!!

Tim I AM HAPPY TO BEAT YOU JOHN

John ah i beatyou

Tim still had difficulty participating in network discussions, even when the teacher was involved. But John showed that he could participate effectively in focused discussions when a topic was established and the teacher interacted with the students, as in this excerpt from a discussion of the class' plans for their Christmas party (as with other examples shown throughout this report, a small portion has been extracted from the full discussion, and the contributions shown are extracted from others made by other participants).

Teacher Robert, what color of frosting do you suggest we use for the cupcakes? John, how many bottles of root beer will you bring for our party?

John red and white frosting! babs
what is bottles?

Teacher John, bottles is what the root beer comes in.

John two rootbeer bottles babs

Teacher John, do you want a red tree and white frosting on the cupcakes????

John yes babs

Teacher John, you really want to frost the tree with red frosting?

John red frosting line on the tree babs

Teacher John, I understand you now. You want to make red tinsel on the tree with red frosting. That is a good idea. What color do you want the tree to be? White?

Robert babs, white is snow green is tree red is hang ball

Teacher Robert, that is a good idea to use white frosting for snow and green for the tree. John suggested we use red frosting for tinsel. For christmas balls, how about some M & Ms?

Robert babs, I think M & M is too big

John mike no m & m are not big small ball

The important role that the adult or more competent language user plays in scaffolding, or raising the level of participation of the child or less competent language user, is well documented in language acquisition literature and discussed elsewhere in this report ("Interactional scaffolding in network conversations"). Sowers (1982) has shown how this dynamic operates in writing conferences, in which the teacher provides various kinds of guidance, including focusing the child on the task, reducing the amount of freedom, and maintaining the direction of the task. Likewise, Bonk (1990) reviews studies that show that students' writing increases in semantic and syntactic complexity when there is a decrease in audience familiarity.

These same dynamics seem to occur in the ENFI discussions. The teacher, who is older, a more competent language user, and not a peer, can have a tremendous influence on the ways the students communicate.

The teachers we worked with shaped the interactions in many different ways. The teachers we saw above discussion "Staying alive" and the class' Christmas party asked questions for anyone to answer and then followed up with comments or more questions. Another teacher, who was working with students new to the network whose English proficiency was in early stages of development, asked a question, had all of the students answer that question, and then asked another one, as shown in the example below. The students waited to participate until they saw the next question from the teacher. They typed their reply and waited for another question. The conversation was orderly, and students could see clearly what the other students had written. When the students became more accustomed to network interaction, the teacher loosened the controls and let them communicate more freely.

Teacher Good Morning my wonderful students. What was the title of the story I read to you?

Linda The singing whales

Dan Title is singing whales

Debra 'THE SINGING IS WHALES'

Susan The music whales

Teacher	The title of the story was The Singing Whales. Is your answer correct? What kind of a story was it, non-fiction, fiction, or historical?
Susan	non-fiction
Debra	Fiction
Linda	The story is a non-fiction.
Dan	non Fiction
Teacher	The story is non-fiction. The scientist studied what kind of Whales?
Debra	HB is whales.
Linda	The scientist studied a humpback whales.
Dan	The whales Hampback.
Debra	Hampback is whales.
Teacher	The answer is Humpback Whales. What was the name of the ocean that the scientist studied in? . . .

Another teacher working with similar kinds of students structured the interaction by holding one-on-one discussions with each student, even though the class was on the network together (examples of this are shown below).

In each case, the teacher balanced the task, the topic, and what she perceived to be the students' English proficiency levels to shape the interaction and attempt to move it to a level that seemed both interesting and challenging to the students.

The Type of Network Activity

The type of activity the participants are involved in on the network can also influence the language they use. For example, in one class, the network was used for discussing math problems, the goal being that students would learn to think about math concepts in English. Since the goal was not to develop language fluency, student contributions tended to be brief answers to the questions.

Teacher Do you know how many slices each Domino's pizza has?

Dennis 5 or 4

Teacher try again

Lucy I want 5 pizza.

Timothy WHY?

Dennis 1 or 2

Timothy 2 or 3?

Teacher We will be ordering large pizzas. Each pizza will have the same number of slices in it. Do you remember how many slices are in each pizza?

Lucy No!

Dennis 12

Steven 8

Teacher Dennis is right. . . .

In another class, the purpose for using the network was to develop fluency with written English. The teacher valued longer, considered messages. She took time to compose her own messages, which tended to be short paragraphs, and the students did the same.

Teacher Hello everyone. I am sorry I could not make it to class last week Thursday because my daughter had a doctor's appointment. So, how did you like the story, "The Tinderbox"? It was my favorite story when I was a little girl. Can you tell me what the story is about? . . .

Mary Good story, dog name is Bull but man friend Bull and man is king can't marry pretty woman and pretty woman's parent angry no marry but man want love heart pretty woman but man idea want tell dog bull and dog run look under shsh see find pretty woman sleep bring run go to man house then man kissed pretty woman and bring back her house.

Ted — Wow mary how far can you remember the story.

Teacher — What did the soldier do when he got to the bottom? He went down with his knapsack and....?

Dan — TO LOOK FOR THE MONEY

Ted — collet the monay

Betty — the man no momey so the man saw witch woman and the man walk to seen that witch woman give to rope down on tree and the witch's grandmother give that tinder box and the soldier down looked for 3 door 1 place 2 place 3 place on door
have money

Joseph — MAN MUST PUT THE APRON ON THE FLOOR SO THE BULL SIT ON THE APRON AND THE MAN OPEN THE GOLD MONEY IN THE BOX

Jenny — ... witch and man arrived at tree and witch said "you climbed to treepls and you get some more money and pls get thinderbox" then he said "ok I'll..." then man climbed at tree and he can't see down tree and but he surprise tree in have rich , wow and he looked 3 doors and he tried to open to door. Man opened the door one small thinderbox...

The Way the Teacher Manages the Classroom Space

In network interactions across distance (electronic mail or computer conferences), participants do not see each other, and all communication takes place in writing. However, on a local area network in which the participants sit at computers in the same room, the classroom space can be used as a communication space as well. Rules can either be established so that this space will not be used (for example, one teacher reminded students, "I want you to say everything through the computer. Don't talk to me. Don't talk to other students, except through the computer."), or the space can be used to plan and negotiate the written interactions in sign language. At Kendall, the computers faced the walls, so the center of the room was open (see classroom layout in the section on "The ENFI classroom"). In some classes the teacher and students used this space to walk around and see what others were writing, ask for spellings of words and clarifications, and elaborate on what they were writing. In these cases, the network transcript shows only a portion of the entire interaction that occurred. For example, this brief exchange took place on the network between a teacher and student.

William on sat. moive" run" . father and brother . with moive.

Teacher William so you saw the movie "Run" with your brother and father? That must be a good movie. Where did you see the movie? What is the movie about?

. . .

William home in moives like good run

Teacher Ok William I know you liked the movie but I asked you to please tell me about the movie. What was the main idea?

. . .

William "Run" Call stupid man police cath run .

Teacher William, Who ran? Do you mean a man was stupid and the police catch the man? . . .

In her field notes, one of the researchers described the off-network interaction that occurred at the same time.

> I volunteered to spell "Hamlet" for William, but he said it is "Run" on the VCR. I told him to explain that it's a VCR movie fr n last Saturday night. . . . Heather [the teacher] told William off the screen to give a summary of the movie he saw. . . . Heather again told William off the screen to give a brief report about the movie. William asked if we were being nosey. I told him we're being curious, and I haven't seen it. . . . William asked me (with voice) how to spell "call," then he asked me if it also means by phoning someone. I said yes, that word has more than one meaning. Then he asked me how to spell "stupid" and "catch." I showed him how to remember how to spell words by looking for roots. He seemed to understand that.

Harste, Burke, and Woodward (1982) pointed out that one "process universal" associated with literacy events is "negotiability," or shifting across communication systems to make sense of or respond to a literacy task. For example, children sometimes shift temporarily from writing to drawing to keep proceeding with a particular writing task. In this example, it appears that the teacher and research assistant allowed William to shift back and forth as needed between signed and written communication, thus giving him the support necessary to continue with the task.

The Language Rules that the Teacher Establishes

An important issue to consider when using a computer network is whether this interactive context for writing is more effective for expressing ideas and content or for focusing on the correct forms of written English. In some classes, teachers initially establish strict rules about language use ("I want to see capitalization, punctuation, and correct spelling"). Students in these classes tend to pay more attention to how they and the teacher are writing ("Sally didn't capitalize i"; "You made a mistake, teacher"--the teachers invariably make "errors" themselves) than to what anyone is attempting to say.

Eventually teachers drop these rules and focus on the purpose for and content of the writing. This may be because such strict rules about surface structure are difficult to enforce and ultimately limit the interaction, because the teachers realize that they make mistakes themselves, because the content becomes more important, or because teachers realize that the printed transcript can be edited later.

Whatever the teacher's reasons for initiating or dropping strict rules about written form on the network, it seems clear that the conversational nature of the writing (discussed in the section on "ENFI in the classroom"), that it is produced and read quickly and so is different from planned, extended writing, makes a focus on form unrealistic and even impossible. Most teachers new to ENFI realize this very early.

Student Proficiency with Written English

The level of students' English language proficiency can make a tremendous difference in the way they interact on the network. The technology allows all students to type and send messages any time they wish, but some may send many messages, while others send few. Some may send short simple messages, and others, long complex ones. The following excerpts from one teacher's class illustrate. The first is the second half of the entire interaction, showing the whole class on the network together. The following four excerpts focus on each of the four students separately: their conversation with the teacher (even though the whole class was on the network at the same time, the teacher essentially carried on a one-on-one conversation with each student) and the other contributions which seemed to influence theirs. In each transcript, student and teacher turns are numbered to show where the interaction begins (at turn 25 in the first transcript) and where turns are missing (turn 12 is missing in Cathy's interaction, for example).

25	Teacher	Cathy do you have to vaccum and wash windows and things like that ??

26	Mary	HUNT [the teacher] GOOD , I SEE TV WAR IN IARQ . OLD WATER TO IARQ,,,
27	Teacher	Mary what happened to the water in Iraq??
28	Cathy	YES I WASH ON THE WINDOW YES ALL HOUSE CLEAN ON SATURDAY LAST SATURDAY I CLEAN HOUSE FINISHED.....
29	William	MARY. LOVE NEW KID BLOCK
30	Mary	HUNT GOOD . I SEE IN WAR IRAQ ALL MANY IN WATER DIE BECOME OIL KILL FISH BRID ALL DIE.....
31	Ali	I SEE TV WAR IN IRAQ OIL
32	William	CATHY. LOVE NEW KID BLOCK
33	Teacher	William you still have not answered my question. Who did you want to win the game?? Did you want the Giants to win or the Bulls to win??
34	William	ALI. LOVE NEW KID BLOCK
35	Teacher	Wow Mary You did watch what happened in Iraq!!! What do you think will happen?? How will they clean it up ??
36	Teacher	Ali What happens to birds and fish in all that oily water ??/
37	William	GIANTS WIN 20 . BULL WON 17 .
38	Teacher	William who did you want to win the game ????
39	Cathy	I SHOWER FINISH THEN CHANGE MY CLOTHES THEN I BREAKFAST FINISHED THEN I CLEAN MY BEDROOM AND DISH ANFINISH TV AND COMPUTER AND TABLE THREE FINISH I CALLED TO MY FRIEND THEN I LUNCH FINSH THEN I WATCH TV OTHER FUNNY SHOW FINSH,,,,,,,,, THAT ALL
40	Teacher	Ok Cathy Did you watch all that news this weekend about the oil spill in Iraq?? What do you think will happen to all the birds and fish??
41	Cathy	NONO I NOT SEE TO ON NEWS NO

42	Teacher	William I know who won the game but who did you want to win ??
43	Mary	HUNT GOOD. VERY BAD IN WAR IN IRAQ ALL MANY WAR KILL HURT IN IRAQ. KILL IN WATER DIE FRSH . TV VERY SAD WATER IN FRSH . MANY PEOPLER AND CHILD AND KID ON TV IN WAR URAQ VERY BAD.....
44	Teacher	William please type and stop talking!!!
45	William	BULL WON 17 , GIANTS WINNER 20 .
46	Cathy	ALI I WANT MORE NEW KID ON THE BLOCK.. I LOVE OF JOE OKAY JOE'S EYE ARE BULE YES.....
47	Teacher	Mary do you know anyone who went to Iraq??
48	Teacher	Ok lets stop now you can turn off your machines now
49	Ali	I SEE TV IARQ IN WATER OIL OCEAN
50	Mary	HUNT GOOD. WAR IN IRAQ . KILL PEOPLE HURT IN WAR IRAQ VERY BAD LIKE NOT IRAQ....

When we look at each student separately, we see that they participate very differently. **Cathy** (who had eight turns) and Mary (seven turns) wrote extended text in response to the teacher's questions. Cathy wrote about her activities during the weekend (even though the teacher had asked about the war in the gulf), and the teacher followed her lead, asking her questions about her weekend. Cathy focused on the same topic throughout the discussion, elaborating more and more on her activities in response to the teacher's questions.

Cathy

11	Teacher	Cathy - Did you watch any news this weekend ? Do you know about all that oil spilling into the gulf?
13	Cathy	NONONO I NOT SEE TO NEWS BUT I HAVE A BUSY I WATCH TV NEW KIDS ON THE BLOCK YES..BEACSUE I HAVE BUSY CLEAN HOME AND TDD CALL TO FRIEND THINGS THAT ALL
14	Teacher	Cathy what chores do you have to do around the house ??

19	Cathy	MY HOUSE IS CLEAN AND PRETTY MY HOUSE . . . THAT ALL
24	Cathy	OKAY ..... I CLEAN MY BEDROOM AND LIVINGROOM AND KICTCHEN ALL HOUSE ARE CLEAN AND DRITY I NED CLEAN HOUSE ALL THINGS .....
25	Teacher	Cathy do you have to vacuum and wash windows and things like that ??
28	Cathy	YES I WAS ON THE WINDOW YES ALL HOUSE CLEAN ON SATURDAY LAST SATURDAY I CLEAN HOUSE FINSHED .....
39	Cathy	I SHOWER FINSH THEN CHANGE MY CLOTHES THEN I BREAKEFAST FINSHED THEN I CLEAN MY BEDROOM AND DISH ANFINSH TV AND COMPUTER AND TABLE THREE FINSH I CALLED TO MY FRIEND THEN I LUNCH FINSH THEN I WATCH TV OTHER FUNNY SHOW FINSH ,,,, THAT ALL
40	Teacher	OK Cathy Did you watch all that news this weekend about the oil spill in Iraq?? What do you think will happen to all the birds and fish ??
41	Cathy	NONONO I NOT SEE TO ON NEWS NO

After the teacher persisted, **Mary** answered her questions about the war in Iraq, not really elaborating on any one point but mentioning various aspects of the war (the water was bad, fish and birds died, many people, including children, were murdered).

Mary

5	Teacher	Mary - did you watch the football game
9	Mary	HUNT GOOD, I NOT SEE FOOLDALL NO NO . I SEE NEW KIDS ON THE BLOCK JORDAN KNIGHT....
12	Teacher	Mary Did you watch any news this weekend ?
20	Mary	HUNT GOOD I SEE ON TV NEW KIDS ON THE BLOCK .. MY SISTHER SEE GO TO VIVST MY YOUR HOUSE. ' GUY NEIXT DOOR'

23	Teacher	Mary I do not want to talk about the new kids on the block right now please answer my questions!
26	Mary	HUNT GOOD , I SEE TV SEE WAR IN IARQ . OLD WATER TO IARQ,,,
27	Teacher	Mary what happened to the water in Iraq??
30	Mary	HUNT GOOD. I SEE IN WAR IRAQ ALL MANY IN WATER DIE BECAME OIL KILL FISH BRID ALL DIE.....
35	Teacher	Wow Mary You did watch what happened in Iraq!!! What do you think will happen?? How will they clean it up ??
43	Mary	HUNT GOOD. VERY BAB IN WAR IN IRAQ ALL MANY WAR KILL HURT IN IRAQ. AND CHILD AND KID ON TV IN WAR IRAQ VERY BAB .....
47	Teacher	Mary do you know anyone who went to Iraq ??
48	Teacher	Ok lets stop now you can turn off your machines now
49	Mary	HUNT GOOD. WAR IN IRAQ. KILL PEOPLE HURT IN WAR IRAQ VERY BAB LIKE NOT IRAQ ....

William (who had seven turns) struggled to answer what the teacher asked him, wrote brief contributions, and never did understand or answer the questions.

William

2	Teacher	William - What did you like best about the football game? Did you want the Giants to win?
4	Teacher	William - What did you like best about the game ?? Did you want the Giants to win?
8	William	YES WIN GIANTS . BULL WON 17 [The Giants won. The Bulls made 17 points. William answers, "Did the Giants win?"]

33	Teacher	William you still have not answered my question. Who did you want to win the game?? Did you want the Giants to win or the Bills to win ??
37	William	GIANTS WIN 20. BULL WON 17. [Repeat answer.]
38	Teacher	William who did you want to win the game ?????
42	Teacher	William I know who won the game but who did you want to win ??
44	Teacher	William Please type and stop talking !!!
45	William	BULL WON 17 , GIANTS WINNER 20. [Fix grammar, spelling, punctuation.]
48	Teacher	Ok lets stop now you can turn off your machines now

Ali seemed to struggle to write anything at all (she had only three turns), and built her turns almost entirely on those of the other students (the text in bold print shows the relationship between Cathy's and Mary's texts and Ali's). In her field notes for that session one researcher wrote, "Ali's still struggling with her part, and it seems she hasn't sent out her message yet. I can sense her uneasiness since everyone is sending out messages." and later, "I now see Ali has been reading her own paper [something she had written before the ENFI session] about her own weekend activities. She has been working on her first paragraph since the beginning of the session."

Ali

3	Teacher	Ali What did you do this weekend ??
13	Cathy	NONONO I NOT SEE TO NEWS BUT I HAVE A BUSY **I WATCH TV NEW KIDS ON THE BLOCK** YES..BEACSUE I HAVE BUSY CLEAN HOME AND TDD CALL TO FRIEND THINGS THAT ALL
17	Ali	ali **watch on t V NEW KIDS ON BLOCK** [Other students have said in their turns that they watched New Kids on the Block]
18	Ali	JOE [a member of the group, New Kids on the Block] I YOU LOEV

21	Teacher	Ali You love someone name Joe ??? Well any way Please answer my question
26	Mary	HUNT GOOD , **I SEE TV SEE WAR IN IARQ . OLD** WATER TO IARQ,,,
30	Mary	HUNT GOOD. I SEE IN WAR IRAQ ALL MANY **IN WATER** DIE BECAME **OIL** KILL FISH BRID ALL DIE.....
31	Ali	**I SEE TV WAR IN IRAQ OIL** [From Mary's discussion of the war in Iraq.]
36	Teacher	Ali What happens to birds and fish in all that oily water ??/
49	Ali	**I SEE TV IARQ IN WATER OIL** OCEAN

It is clear that even though this small class of four students is involved in the "same task," writing on the network together, they are allowed to approach that task very differently and encouraged in their efforts. The English they are able to use is acknowledged, honored, and continued, in a way that makes sense to them and encourages them to write more.

Conclusion

As often occurs with educational innovations, there is also the tendency with ENFI to characterize it according to one's own experience with it, as if the qualities one observes are experienced by everyone. We have heard such contradictory comments as, "ENFI conversations are simple and superficial. Students just play around;" "Students are more motivated to write on the network, and they write better;" Students take ENFI writing more seriously, because they can finally write things they want to write."

We have attempted to show here that network writing in itself doesn't have particular qualities. Rather, its qualities are shaped by many factors related to the contexts in which the writing occurs. Teachers understanding these factors can play a positive role in shaping what the qualities of the writing will be.

INTERACTIONAL SCAFFOLDING IN NETWORK CONVERSATIONS

Joy Kreeft Peyton and Martha French

Parents, teachers, and language researchers have long understood the importance of interaction in learning a spoken or signed language. A more competent user of the language (a parent, other adult, or older child with a young child learning a first language, or a native speaker with a nonnative speaker of a second language) interacts with the language learner in a supportive conversational context. The more competent language user facilitates the interaction by accepting the learner's utterances as conversational contributions and responding to them; modeling the correct use of the language; and "scaffolding" the interaction, providing language props that will help the learner move to a new and more advanced level of language use (Bruner, 1975; Cazden, 1981). This scaffolding can take several forms, including:

- modifying one's own language, so the learner can understand it;
- asking questions so the learner has something to talk about or to prompt the learner to elaborate;
- repeating and rephrasing the learner's utterances;
- using new words that are understandable to the learner in the conversational and social context, and that the learner can then use;
- requesting clarification, and thus encouraging the learner to rethink and restate ideas.

Teale (1982) expands this understanding of scaffolding to include literacy learning. He claims that "literacy comes about as a result of the ways children interact with adults in problem-solving situations that involve reading and/or writing," and that these "literacy interactions . . . lead the child to internalize aspects of reading and writing and eventually to understand how to use them independently" (quoted from Lehr, 1985, p. 668).

Since the early days of the ENFI project at Gallaudet University, we have seen this scaffolding and language modeling taking place, in network writing and in network-related discussions held in sign language, in almost every classroom we have observed. We believe, therefore, that network writing provides a promising context for deaf students to acquire written English and develop their thought processes around the printed word. As they engage in purposeful, interesting conversations, using the English they know, they continually receive feedback about what they have written. They also receive a rich blend of English from the written contributions of the other participants, that they can make use of and build on.

In this section, we give examples of the many and various opportunities for this scaffolding to take place that network interaction has provided in the classrooms we have observed--on the network itself as the students wrote, off the network as they conversed with others in sign language about what they were reading and writing, and in followup sessions, conducted primarily in sign language. Of course, the scaffolding did not always lead to immediately visible changes in the students' use of language, but often it did.

Scaffolding on the Network

In the network writing, we saw numerous instances of scaffolding. Sometimes this took the form of direct modeling of particular English words, spellings, structures, and accounts. It also took more indirect forms, such as the use of questions and comments to elicit more writing, focus students' thinking, and develop their problem solving skills.

Modeling Vocabulary

At times, the teacher simply supplied the correct word for one the student had attempted.

Jessica Hi Teacher, yes I want a nailpanit kind of pink . . .

Teacher Jessica, do you mean fingernail polish?

Jessica Oh yes, Thank you Leslie.

Not all language modeling was as simple as this example, especially if the teacher didn't know what the student meant by a particular word or phrase. The following interaction shows a lengthy negotiation between a teacher and student, in which the teacher had to figure out what the student's phrase "title sister and title brother" meant before she could provide an appropriate language model (the student's and teacher's use of this phrase is highlighted for the purpose of illustration).

Cathy good morning heather . how are you ? I AM FINE .. I A,M HAPPY WITH EVERYBODY .. I AM SORRY TO YOU BEACUSE MY BESR FRIEND AND **MY TITLE SISTER AND TITLE BRITHWER** OKAY I VERY SIORRY OKAY I WENTTO STORE NAME FAR HECHT'S AND WOODOIES IN MAYLAND YES I HAVE FUN WITH MY MOTHR OKAY I AM HAPPY ,.....!!!!!!!!!!!!!!!!!!!!!!!!

Teacher — Cathy I am happy that you are happy!!!!!!!!!!!! The stores were in a mall? Were there many other stores? Why are you sorry about **little brother and little sister?**

Cathy — OKAY OKAY **TITKLE STORY SISTER AND BRITHER** OKAY .. I CHAT WITH MARCIE AND JOY TALK ABOUT THING DOING TO WEEKED I CHAT LONG TO JOY AND MARCIE I HAVE WITH STORY **TITLE SISTER AND TITLE BRITHER** ... I FEEL HAPPY WIOTH MY BEST FRIENDS I HAVE FUN AND CHAT I LIKE TALKING LONG LONG TIME ... I AM SORRY OKAY OKAY HAPPY WITH MY BEST FRIEND OKAY

Teacher — Cathy did you read a story named **"Little sister, little brother."** I do not understand.

Cathy — NOT FINSH OKAY .. IS SEE TO FEAD WOMAN AND MAN OKAY THAT GALLUADET..... OKAY NONOONNONOONONON I SAY **TITLE SISTER AND BROTHER** GOOD FUN AND TALKING CHAT LONG MEANS **TITLE SISTER AND TITLE BROTHER**

Teacher — Cathy are you trying to spell **little-not title.**

Cathy — SOME PEOPLE DEAF IN STORE I WALKING TO STORE THEN I WAS TO DEAF WOMAN AND MAN ... BUT **MY TITKLE SISTER AND MY TITLE BROTHER** THAT JOY AND MARCIE OKAY .. DO YOU UNDERSTAND TO ME ???????

Teacher — Cathy so you mean that **you like to call Marcie and Joy your brother and sister?** They are good friends **like brother and sister?**

Cathy — YES BUT **MY TITLE SISTER AND BROTHER** YES BUITI **LIKE BEST FRIEND AND BROTHER AND SISTER** OKAY .... I ENJOY FRIENDS OKAY OKAY

Teacher — Ok Cathy now I understand. Before I did not understand "title." The best way to say it is **"Joy and Marcie are like my brother and sister."**

Modeling Spelling

In this example Vincent is explaining that his family, who are hearing, know very little sign language. Again, the word the teacher models for Vincent is highlighted.

Vincent	. . . I know now well my family all no deaf here so but litle **sing** too but I ask follow hard understand **sing** about I want go eat McDonald. . . .
Teacher	Vincent you said your family knows a little **sing**. Sing means to use your voice with music. You mean your family knows a little **sign**! Right?
Vincent	ohhh okk well my family not sing so sorry well my family **sign** right

Modeling an Account

Language modeling or scaffolding doesn't have to be confined to specific spellings, words, or structures; rather, an entire narrative or account can be modeled by the teacher. Here, a class was discussing what they did in science. Different students provided different accounts, some more and some less thorough. Then the teacher gave her own account, building on what the students had said and modeling the correct way to say it.

Teacher	Good morning class!!!!! Let's talk about what we did in Science yesterday, okay?
Pam	[the teacher aide] Robert you are being quiet. Would you like to tell me what you did in Science yesterday?
Robert	babs [the teacher], crayon with wax paper then sun after that then look pretty ??right??
John	first put waxpaper andput color another waxpaper and iron and melted and dry for five sec gule on paper and dry then on window then sun look pretty are i right?
Tammy	I made Science of the leaves maybe today for small two leaves
Teacher	John, Wow, yes, you are right!! We put shaved crayons on wax paper then we put another sheet of wax paper over the crayon pieces. We ironed the

crayon pieces. The crayons melted. We then framed the melted crayons in a leaf frame.

Pushing for Elaboration

Scaffolding on the network also moved beyond providing a direct language model. Teachers also asked questions to encourage students to expand on their original contributions, as in this discussion of Mike's project for the science fair.

Mike	Dear leslie i want science fair i want a soda project ok ..
Teacher	Mike, that's a wonderful idea about doing something with soda and it is a liquid too. [Another student had said she wanted to do a project with liquids.] Is there something you want to know about soda?
Mike	Dear leslie this soda have many different kind of name soda then check many have soda of score and point .. then go down stair to class then i will tell to student many count for soda.. . . . My soda title is "wahty your prafec of kind soda for K.D.E.S."
Teacher	Mike, that would be interesting. What soda do you think would be students' preferred drink?
Mike	I think student like a Pepsi..

Pushing Students to Focus on a Particular Task

In a problem-solving session, another teacher asked the students how they might help a student who had cheated on a spelling test to get ready for future tests. As we can see in this excerpt, most of the students suggested possible punishments rather than giving advice to the student. The teacher repeated her instructions to help them focus on that task.

Teacher	How should the boy get ready for the tests? What can he do so he does not need to cheat?
Linda	He must get a policy hat or give him a F.

Teacher Linda, what is a policy hat??

Linda Ms Hunt, Those school have a policy hat it looks like a sit in the coner you know.

Teacher Everyone: Please give the boy some ideas to use for studying so he will not have to cheat. Remember the boy says he gets nervous when he has to take a test.

Linda He need to review his work, prctice and studing the words until he remeber.

Teacher Linda, those are some good ideas!

Developing Students' Math Language, Problem Creating, and Problem Solving Skills

The following is a powerful example of how a teacher led two students, who were at two very different places in their understanding of and ability to use math language, to express two math concepts correctly. With the help of the teacher's prodding and the teacher's and other students' modeling, Dennis moved from a skill he had already mastered (writing number sentences) to a new one (writing a story problem), and Steven moved from misunderstanding and non-participation to the ability to express one of the concepts--to write a number sentence.

Because so many dynamics occur here at once, the relevant student and teacher modeling and student performance are described in brackets. Turns in the conversation are numbered to show where turns have been extracted from the entire interaction.

1 Teacher Hi everyone! Well, I'm glad we are all on ENFI now! Please explain to me what a number sentence is.

[THE TEACHER INTRODUCES THE TOPIC, NUMBER SENTENCES]

11 Dennis You tell me a example.

12 Cher SUZANNE FAST TO WALK 30 MILES DENNIS FAST OR LESS 01 MILE FOR WALK.

[A STUDENT GIVES AN EXAMPLE OF A STORY PROBLEM]

13	Teacher	Cher gave an example of a story problem. What would be the number sentence for her problem?
14	Timothy	30-1=H or F or A
16	Dennis	30-1=z
		[DENNIS SHOWS THAT HE KNOWS HOW TO CONSTRUCT A NUMBER SENTENCE]
		[STEVEN OFFERS NO ANSWER TO THIS PROBLEM]
17	Teacher	Dennis and Timothy are right!
33	Teacher	Let's say I have $10.00, and I want to buy a toy that costs $5.50. What would the number sentence be that will help me know how much money is left?
		[THE TEACHER GIVES AN EXAMPLE OF A STORY PROBLEM FROM WHICH TO CONSTRUCT A NUMBER SENTENCE]
34	Steven	15.50
35	Teacher	Steven, what is the number sentence?
36	Steven	addd
37	Teacher	So you mean 10.00 + 5.50 = n?
		[THE TEACHER RESTATES STEVEN'S ANSWER AS A NUMBER SENTENCE]
38	Steven	I am forget
		[STEVEN GIVES A SOLUTION TO THE PROBLEM RATHER THAN A NUMBER SENTENCE (15.50), GUESSES THE WRONG MATHEMATICAL PROCESS (addd), AND THEN GIVES UP (I am forget)]

48 Dennis 10.00-5.50=z

[AGAIN, DENNIS WRITES A CORRECT NUMBER SENTENCE]

49 Teacher Dennis, that is excellent! Now I would like for YOU to make up a story problem.

59 Dennis joe collect 500 football cards and mary collect 38 football cards how many more joe than mary?

[DENNIS CONSTRUCTS A CORRECT STORY PROBLEM]

63 Teacher That is an excellent problem that Dennis wrote. Who can think of the number sentence for his problem?

67 Steven 500-38=n

[STEVEN GIVES THE CORRECT NUMBER SENTENCE]

71 Teacher Steven and Harvey and Cher are right!

Scaffolding Off the Network

Advocates of bilingual programs for deaf students stress the importance of using students' first language (ASL or some other form of sign language), which they are more familiar and comfortable with, as the basis for developing their proficiency in a second language, written English. As Bouvet (1990) argues,

> Sign Language allows deaf children to be received in terms of something positive, namely their marvelous ability to express themselves in a visual mode. . . . When deaf children are recognized as linguistic beings and afforded visual speech in a positive atmosphere of communication and accomplishment, they acquire [language] naturally. (p. 235)

Even by the end of the year, many ENFI students didn't feel as comfortable communicating in writing on the network as they did in sign language. The use of sign language to support and build on the network interactions allowed them to use what they knew and felt comfortable with to work toward what they didn't know as well.

During ENFI sessions we observed many instances of scaffolding in sign language. The research assistant's field notes are filled with descriptions of her and the other students interacting in sign language to help students understand the messages appearing on their screens and write their own messages. For example, on 1-28-91 she wrote,

> Sally signed out Leslie's [the teacher's] first message. Then she asked me what "Gulf" is [the teacher had written something about the war in the Persian Gulf], and I used classifiers to illustrate the continents of Iraq, Kuwait, and Iran and where the water flows in. . . . Jane asked Linda off the screen to spell "forget." Linda spelled it and then signed two roots, "for" and "get." Vincent asked Linda off the network how to spell "steal." Mike joined in but spelled it incorrectly. I spelled it and told him it's present tense. The past tense is spelled "stole." Vincent wanted the present tense. Sally asked me how to spell "videotape" . . .

In followups to the ENFI sessions some teachers use the printed transcripts of the discussions to further refine, correct, and elaborate, usually in sign language, on what the students have written. When on-network and off-network scaffolding are combined in this way, students have multiple opportunities to think about their language use, and teachers can correct errors and misunderstandings that were missed during the network conversations. For example, the following shows the complex ways that William's network writing was scaffolded both on and off the network, both during and after the ENFI session (turns are numbered to show where this interaction has been excerpted from intervening turns).

3	Teacher	Good morning William what did you do on saturday?
6	William	on saturday to my father birthday
7	Teacher	William did you have a cake for father?
8	William	wrong
11	William	yesterday birthday to my father oct 14
13	Teacher	William oh your father's birthday is on sunday not saturday. . .
18	William	no saturday and wrong throught birthday
50	Teacher	William, last night Oct. 14 you had cake for dad's birthday?

51	William	big cake eat delicouslike cake wow ?
		[The research assistant wrote in her field notes, "William asked me how to spell 'delicous' which I did."]
54	Teacher	William what kind of cake? Chocolate?
60	William	no chocolate i like chocolate and yes ilike vanilla and cake
		["William asked me to interpret Heather's question about the cake. I signed it out in ASL and he answered 'No! Vanilla!' I told him to answer that. I helped him spell 'vanilla.'"]

In writing and in sign language, the teacher and the research assistant helped William to express himself and tried to clarify what he was saying. The followup provided another opportunity to clarify this conversation. The class looked at the transcript and discussed William's answer in line 8, "wrong." Students said they didn't understand what he meant by that, and the teacher asked William to say more about it. William explained that he had had a birthday party for his father on Sunday, not on Saturday, he had been wrong when he said it was Saturday. The teacher wrote on the board an alternative way of expressing this idea:

> Father's birthday was on Sunday, not Saturday. I was wrong.

In another network interaction, Mary never did pick up on the teacher's model for how to say "husband."

35	Mary	heather, this kown i like feel your wife father what your name;
38	Teacher	Mary are you asking my name?
43	Mary	me kown don't wife father name,,,,,,
48	Teacher	Mary . . . do you want to know my husband's name?
53	Mary	haether i mad with you baby sarh jilao

56 Teacher Mary!!!! Let's not talk about Sarah yet. I asked you a question, do you want to know my husband's name?

63 Teacher Mary, do you want to know my man's name?

She didn't answer the teacher's questions, she didn't see that by "wife father" she meant to say "husband," and she eventually started writing about another topic. But in the followup session, the teacher was able to focus on this again. She wrote on the board:

Mary i like feel your wife father what your name

Heather, what your husband's name?

Heather Mary, my husband's name is Gabriel Jilao.

Wife is Heather Jilao
Husband is Gabriel Jilao
Girl (daughter) is Sarah Jilao

Then she explained that she and her husband have the same surname and showed the class pictures of her family.

Some teachers worry that students will not learn the conventions of standard written English if they are allowed to write incorrect English on the network. In followup sessions the class can edit the transcript together. For example, one teacher wrote on the board a student's first line of an ENFI conversation. The student was acting as the "teacher" that day. (Playing the role of "teacher"--which involved asking the other students questions, continuing conversations with them, and modeling language for them--was itself a scaffolded behavior. This student took on that role halfway through the school year, after the classroom teacher had modeled these behaviors in many ENFI sessions.)

Teacher hello everyday! how are you ????? i look at yer evereasch loo tired!!!!

In the followup, the teacher changed "everyday" to "everyone," and the class agreed that the change was correct. They agreed that "how are you?" is correct. They then agreed that "evereasch" should be "everyone," and the teacher changed it on the board. She then told them that each sentence should begin with a capital, and one student made the changes.

In another session, the teacher used the same transcript to discuss what constitutes an appropriate response. She wrote on the board Ali's response to the "teacher's" question:

Teacher hello everyday! how are you ????? i look at yer evereasch loo tired!!!!

Ali firda I WITH BOYTHER FIGHTS please SOTP YUO BOYTHER

and said to Ali, "Cathy was asking you how you are. You answered" (and pointed to the line on the board.) Ali said, "I goofed" and, in discussion with the teacher, wrote on the board, "I feel fine." This discussion yielded a rather immediate and visible result. In the next ENFI session, Ali did reply appropriately to Cathy's question:

Cathy hello ali. how are you ???? i feel whoops today frist time today!!!! what you doing weekend and taking about friend weeknd of ??

Ali SAT I BOOK READ " CRZAY FOR YOU" LONGED GO ROOM dEB SLEEP TIRED
MY WEEKEND

Finally, a very small bit of network writing can be the springboard for a considerable amount of expanded discussion in sign language afterwards. In one ENFI session, for example, Ali, who had very limited proficiency with written English, wrote the following:

firda I WITH BOYTHER FIGHTS please SOTP YUO BOYTHER

Cathy, acting as teacher, tried to get more information, but Ali was able to provide very little elaboration on the network:

Cathy ali please again i not understand of your answer okay you need senctnce!!!!!!!!!!!!!!!!!!!! . . . ali please you answer of me now !! what means your brother fight with you what means . so when you fight wiht your brother ???

Ali I MAGAZINE READ BUT MY BROTHER TOOK IT I GOT MAD MY BROTHER FAULT MY BROTHER FIGHT WITH ME

In the followup session, the teacher wrote Ali's first turn on the board, asked her what she had written, and the following signed discussion ensued:

Ali	Friday I was with my brother who kept fighting with me. I told him to stop.
Teacher	You and your brother fought?
Ali	Yes.
Teacher	You want who to stop?
Ali	I stop my brother. I'm tired of it.
Teacher	You are tired of brother fighting with you. Why were you both fighting?
Ali	Really I did not know. When my sister and my parents went out. My mother was with me. I was real tired. My brother tried to do something but quickly backed off. Then he started physically fight with me. I asked my mother to stop him. [giggling]
Teacher	so you mean you were relaxing, sleeping and your brother kept on tapping on you. You told him to stop but he kept on tapping on you?
Ali	(Nods affirmatively.)
Teacher	Oh I see. Were you mad?
Ali	(Smiling.) Yes.
Teacher	Did you hit him back?
Ali	(smiling) Yes.

Ali's one line of print on the network generated a signed conversation in class in which her knowledge and language skills were honored and she could elaborate on what she had written. This signed interaction could easily lead to another network discussion of this topic, and the discussion could continue from session to session, moving back and forth between sign and print, elaborated on and extended each time.

Conclusion

In this section we have shown the many different opportunities that network writing provides for scaffolding students' written English. Both on the network in writing and off the network in sign language, the teacher, the research assistant, and the other students in the classes accepted and built on students' written attempts. This often took the form of direct corrections of specific vocabulary and word spellings, but it also included eliciting and providing elaborations on topics, and providing examples of different writing styles and ways of thinking. In short, there were multiple opportunities to correct and extend the students' competence, in writing and in thinking.

STUDENT DEVELOPMENT

Joy Kreeft Peyton
With Heather Jilao and Leslie Brewer

In order to document students' development in writing on the network, we chose six focal students from two classes in the Special Opportunities Program (SOP). Students in SOP classes are not functioning at the same academic or social levels as their peers due to a variety of factors, including developmental delays, communication problems at home (where in some cases parents are hearing and don't sign), previous educational experiences, and other disabilities in addition to deafness. Three students were selected from each class during the 1990-91 school year, to show the range of abilities represented in the class and to illustrate different developmental patterns and dynamics. The teachers chose the three students that they felt best represented the range in their class and had made the most interesting progress during the year.

The data for analyzing these students' development come from group interviews conducted with each class at the end of the year, an interview with each teacher at the end of the year, and samples of the students' writing from network transcripts throughout the year. The teachers themselves collaborated in the preparation of these student profiles.

Beginning Literacy Students

The first three students come from Heather Jilao's class of four students. The students were 12 years old and in middle school. All four were functioning far below the other middle school students at Kendall and had a variety of learning problems, including poor memory retention, short attention span, social immaturity, and low motivation and self-esteem. All four students had been at Kendall for several years, but two were new to the middle school, having come from the intermediate department at the beginning of the year. The curriculum, designed for low-functioning students, emphasized daily living skills, functional language and math, and career education.

Heather's goals for ENFI were to immerse the students in written English, build up their self-confidence with using English, and encourage them, in a non-threatening conversational context, to take risks with English. In the network conversations they were able to use English for real purposes to communicate about topics that were important to them, and not just to perform a class assignment for the teacher to evaluate. They could see that language, and English in particular, has a function and that they can use it to accomplish things. Within the structure of a primarily one-on-one interaction with the teacher and one other student (later in the year) about a predictable topic (what they had done over the weekend), the students had ample freedom to experiment.

Heather's class focused on ENFI activities one day a week for two 45-minute periods, during Language and Reading. They had a written discussion on the network for the first period, and then discussed the printed transcript in sign language for the second.

Heather believes she saw changes in the whole class from the beginning to the end of the year. At the beginning of the year:

- All but one of the students needed a lot of prodding to participate at all in the network interactions, and particularly to understand what others were writing, to answer questions, and to stay on a topic. There was general confusion about who was saying what and who was addressing whom. The students seemed to be writing more to themselves than to anyone else. To alleviate the confusion, Heather structured the conversations, carrying on individual conversations with each student, even though the whole class was writing on the network together. She believed that if she didn't do that, the students would be confused and intimidated and wouldn't participate. Later in the year, the most English-proficient student in the class joined her as "teacher" and also carried on one-on-one conversations with each student. However, a great deal of encouragement was needed to get the others to converse with this student, and one student communicated only with the teacher the entire year.

- The students would freeze up when they needed to write anything, either on the network or in class. They were afraid to take risks. "They had the potential to get their point across in written form, but they didn't realize it; they were intimidated; they were afraid they were going to be wrong; they had the language inside, but they were afraid to express it." (Interview with Heather Jilao on 5-28-91)

- They seemed much more tied to signed than to written interaction. For example, in her fieldnotes one day, the research assistant wrote that William asked her off the network where she had been (she had been away on vacation), asked her if the other researcher was pregnant, told her that his parents are divorced, and told her about his grandfather's house in Washington state. He clearly preferred to communicate in sign. Another day the research assistant wrote, "Cathy and William started talking to me. It seems everyone's in the mood to talk off the screen." The students depended heavily on the research assistant for help with reading the teacher's messages and for spelling words they wanted to write. Her notes are full of descriptions of her spelling words for the students.

By the end of the year, Heather believes the students became more comfortable with using written English. They still asked for help with vocabulary and spelling, but now seemed to feel they had things to say--their own issues and their own words--and they simply needed some help to say them. She believes they discovered that they could use English to

communicate, where before they didn't even want to try to communicate in English. She also believes she saw improvement in their English skills, not only on the network but in their other writing as well. Most of the students still preferred face-to-face conversation to network writing, but they were more willing and able to communicate in writing.

Development of Individual Students

William

Heather noticed the most improvement in William. William was 12 years old at the beginning of the school year. He is profoundly deaf from a hearing family, and has no opportunity for sign communication at home. His father has participated in a few sign classes at Kendall, but has very little sign language proficiency, using only one or two signs at a time. William rarely sees his mother, who does not sign at all. His father's live-in girlfriend knows no signs. His younger brother, also hearing, communicates with the signs William has taught him. During his year in Heather's class, William often came to school confused or upset over misunderstandings and communication problems at home.

William has been enrolled at Kendall School since preschool, so is quite proficient in ASL (with a P-level of 4+).[7] However, he read at around a first grade level at the beginning of the school year and had little confidence in his ability to comprehend written text.

At the beginning of the year, William had difficulty writing on the network. He wrote brief, three- and four-word contributions and seemed hesitant to use even the English vocabulary that he did know. He often missed the point of what others wrote to him, and the reader needed a lot of background information to understand what he was writing. The following excerpt from an early transcript (10-11-90) gives an indication of the brief writing that William did and the prodding the teacher had to do to elicit it. (This conversation, as with the others shown below, was interspersed with other contributions from the students and teacher.)

---

[7] P-levels come from the Kendall Communicative Proficiency Scale (P-Scale), a 14-point scale for rating the communicative proficiency in sign language of deaf and hard-of-hearing children. The scale consists of eight summary levels of language development (P-0 through P-7) and six intermediate levels (P1+ through P6+). The rating levels are based on content, cohesion, use, form, and reference. For more information about P-levels, see French, Hallau, and Ewoldt, 1985.

10-11-90

William	heather [the teacher] how are you feel and fine.
Teacher	Hi William, I am doing okay but I am tired. So, is Marcie your girlfriend?
William	my grilfirend cathy
Mary	william do have sis . do have bor my father wife mother
William	no
Teacher	William thank you for answer my question!!!!!! So cathy is your girlfriend that's nice.
William	thank heather
Teacher	William, anytime i like to help you!! Last night you watch TV?
William	yes
William	plaece water
Teacher	William it's PLEASE not plaece, no water now *Answer my question please. Last night you watch TV?
William	football
Teacher	William, what names of football teams?
Teacher	William, you not answer my question, what name of football team?
William	yesterday football

(The session ended at this point.)

Not only was William writing limited English, but the teacher was also using a simplified form of English to try to help him understand her.

By the end of the year both the teacher and the research assistant observing the ENFI sessions felt that William was making more of an effort to write on the network and to

understand what others were writing. He used a wider range of vocabulary, responded more to questions, asked questions, and continued topics from turn to turn. He no longer seemed intimidated to use the vocabulary the teacher believes he had inside him all along. She observed him writing notes to friends and to his parents (who often wrote with him to communicate), and helping other students on the network (he often spelled words for Ali, who also had problems with written English; see discussion of Ali below).

The following two excerpts show William giving accounts of his weekend activities, responding to requests for clarification and elaboration, and continuing topics in response to questions. (At this point Cathy, the student with the highest English proficiency, was acting as "teacher" along with the classroom teacher, Heather.)

4-29-91

William MY WEEKEND , SATURSDAY REST LEG HURT SOLLEN . YESTERDAY , I AM TRIED ME AND HURT LEG, YESTERDAY REST.

[Off the network he had signed to Heather, "My leg was swollen, specifically my knee was swollen, how do I spell that?" Heather and the research assistant spelled "swollen" for him.]

Cathy I NOT UNDERSTAND OF YOU .. WHAT YOU TALKING ABOUT? WILLIAM.

William MY WEEK. WHAT ABOUT TALK. CATHY UNDERSTAND ME

William I BORED ABOUT WEEKEND PERIOD ..... ON SATURDAY ME REST HURT LEG SWOLLEN MY LEG HURT . NEXT NOW , YESTRDAY I AM TRIED ME

Cathy WILLIAM I UNDERSTAND OF YOU ... BETTER YOUR LEG FEEL BETTER ?????

William YES YES YES YES YES FEEL LEG

Cathy WILLIAM .. YOUR LEG CAN WALKING ??????????????????

Teacher Cathy I think William is an old man !!He is always talking about hurting!!!!!!!!!!!!!!!!!!!

Cathy HEATEHR HE SAY HE LEG HURT NOW FGEEL BETTER ..

William I LITTLE CAN WALK . NO RUN BECOME SWOLLEN.

****

5-6-91

Teacher William what did you see on tv about the people mad at the police?

William yes heaed news fight people and police. many people crowd fight police . some police hurt .

Teacher William you are right. The people were very mad at the police. Do you know the reason that the peopie were made at the police?

William I SAW ON TV . YES MAD POLICE CALL MAD PEOPLE ROCK CAR.

Teacher William do you think the people were right or wrong? Do you think the police were right or wrong?

William I THINK WRONG PEOPLE. I THINK POLICE RIGTH .

Teacher William why do you think the people were wrong? Maybe they were frustrated.

William WHY PEOPLE ROCK TO POLICE.

Teacher William it is a long story and it is time to go. I will tell you more about the story when we go downstairs.

William still had a long way to go at the end of the year in terms of effective communication in print. However, during the year on the network he made tremendous progress in terms of communicating on an equal basis with other students and the teacher, expanding on his own messages so they could be understood, and even initiating interactions with others.

Cathy

Cathy was 12 years old at the beginning of the year. She is from Cape Verde off the coast of West Africa, where her father still lives. She lives with her mother, who is hearing and whose first language is Portuguese, but who does sign with Cathy, using signs to support oral English communication.

Cathy has a severe hearing loss, but wears a hearing aid and makes use of the hearing she has. She started school at Kendall at age eight (before that she was in school in Portugal), and is proficient in ASL (P-level is about 5).[8] She reads at a second grade level.

Cathy started the year with more advanced English skills than the other students in the class. Although her English was far from perfect, she was able to participate in conversations on the network with the teacher and individual class members, making relevant contributions and responding appropriately to the contributions of others. This excerpt from an early transcript (10-15-90) shows that although Cathy did not always follow what the teacher was writing, she wrote fluently (relatively long and connected entries) and after one confusing contribution provided relevant information in response to the teacher's questions.

10-15-90

Teacher Good morning Cathy, what did you do on Saturday?

Cathy hello heather .. i am fine ..... i went harvey's house but mad some fel crying yes my face only hurt beacuse harvey's hand then my face very hurt .... i feel little happy but harvey little mad to me some happy some friendly some good smlie but yesterday at tdd joy mad to me yes ... beacuse ui feel good with mary and william

Teacher Cathy why did your face hurt? did Joy hurt you?

Cathy and you i happy with our friend-:.. on sunday i have busy my friedn hearing ... . and i have fun weekend many time next i going to marcie's house yes .. on sundfay my wash tehn dry then pretty next weekend i have much fun yes ..

Teacher Cathy are you talking to me?

---

[8] A P-level of 5 means that the student can produce brief narratives, in relatively complex form. The meaning and structure of the narratives is clear. Some of the details may be hazy but are readily clarified by questioning.

Cathy	heather yesyeysyeysyeysyeys i talking to you ywes
Teacher	Cathy thank you . Now please answer my question again, did Joy hit your face?
Cathy	heather .. yes joy hit to my face than i many crying yes
Teacher	Cathy did Joy Hit you at School? Why did Joy hit you?
Cathy	nonononononono at home yes .. on saturday not at school no no i say on saturday at home frist joy hit my face then my face very hurt little .. many crying yues fight yes
Teacher	Why did Joy hit you?
Cathy	beacuse joy mad mad mad mad much mad to me yes
Teacher	Cathy did Joy come to your house? That was very wrong for him to hit you. Is he still your boyfriend?
Cathy	n9o way not my boyfriend onononononononononnononono way way way way ... noy my house okay joy's house okay
Teacher	Cathy, last night you talked with Marcie and Mary on the TDD?
Cathy	ohohohoohohohohoho yesyesyeysyyeysyeysyeys on sunday many called to me on tdd yesyes frist ed the two marcie three mary called to me afetnoon i called to joy tehn joy off phone i see light phone off phone i off phone .. i not say bye to joy late .. mary and marcie talking about thing ..... ed called to me

Heather noticed that Cathy was often bored and frustrated with the conversations. She could write faster than the other students, and Heather, who was writing with all of them at once, couldn't always keep up with her. So in March, Heather asked Cathy to play the "teacher" role along with her, writing individually with the other three students. Cathy quickly picked up the strategies Heather had used--starting and continuing a separate conversation with each student, asking a question of each student tagged with the student's name, requesting clarification and elaboration, and continuing topics with questions, as the following excerpts illustrate:

3-4-91

(Opening the conversation with each student)

Cathy hello everyday. ho are you?? what you doing weekdn you have of fun weekdn?? ali.

[In the followup discussion after the ENFI session, Cathy changed "weekdn" to "weekend" and "everyday" to "everybody"]

Cathy william.. what you doing weekend? how you feel i look at your face are sad .. what up weekend

Cathy heather.. how you feel back?? what you doing on weekend???? you havea fun with your family for weekend?

Cathy mary .. how are you? what you doing weekend??

****

(Requesting clarification)

Ali sat I BED ROOM CLEAN. I OUT HOME IN RABBIT FOR rabbit eat.

Cathy ali .. i not understand .. little better . so you went going to see rabbit ?? on saturday

Ali MY HAVE NEW RABBIT HAVE RABBIT BACK for rabbit hungry want.EAT

(The session ended soon after this.)

****

(Probing--without much success--for elaboration)

Cathy william.. what you doing weekend? how you feel i look at your face are sad .. what up weekend

William no sad feel

Cathy how are you feel you re tired ?

William no feel tired

Cathy what you how you feel ?? william

****

(Continuing topics)

Cathy heather.. how you feel back?? what you doing on weekend???? you havea fun with your family for weekend?

Teacher Hi Cathy yes my back is much better. I rested alot on friday. Saturday was a beautiful day so Sarah and I and our friends went to the park. We had a good time Sunday sarah's friend came to play and i cleaned.

Cathy ohh pity and sorry you you re clean home . your husband going to work can't help you??

Teacher Cathy no Gabriel had to go to work but that is ok

By the end of the year Cathy, like Heather, was able to manage conversations with several people at the same time.

Interestingly, in the end-of-the-year class interview Cathy said that she prefers face-to-face, ASL communication to communicating on the computer. "[In ASL] I can say everything instantly. On the computer in print, I have limited vocabulary and can't say things I could say easily in sign. I keep on forgetting how to spell and have to keep on asking. Constantly asking for help is so time consuming. It's better to communicate through the air." Even though she appeared to write fluently and effectively in network interactions, she still found them a challenge.

Ali

Ali joined Heather's class in January (her first ENFI session was on 1-14-91). She is from El Salvador and her first language is Spanish, the language used at home by her parents, both of whom are hearing. She is profoundly deaf. Her mother knows some English but does not sign, even though she took some sign language classes at Kendall. Ali's older sister, also hearing, signs some with her, using home signs.

Ali began schooling when she was eleven and came to Kendall. Before that, she had not been to school. She was at first placed in an academic SOP class (transitional to regular classes), but was not successful and was moved to a class for lower functioning students. While in Heather's class her P-level for ASL was 3+[9], and she read at about a first grade level.

Ali provides an interesting contrast to Cathy, because she began the year with less proficiency in English than the other students in the class. She could read and write very little. It took her a long time to write one contribution on the network (she had only four turns in the conversation below), and she built her turns almost entirely on what the other students wrote. The following transcript illustrates. The text in bold print shows the parts of Cathy's and Mary's texts that Ali appeared to use to write her own contributions.

1-28-91

3	Teacher	Ali What did you do this weekend ??
13	Cathy	NONONO I NOT SEE TO NEWS BUT I HAVE A BUSY **I WATCH TV NEW KIDS ON THE BLOCK** YES..BEACSUE I HAVE BUSY CLEAN HOME AND TDD CALL TO FRIEND THINGS THAT ALL
17	Ali	ali watch on t V NEW KIDS ON BLOCK [Other students had also said in their turns that they watched New Kids on the Block]
18	Ali	JOE I YOU LOEV
21	Teacher	Ali You love someone name Joe ??? Well any way Please answer my question
26	Mary	GOOD , **I SEE TV SEE WAR IN IARQ . OLD** WATER TO IARQ,,,
30	Mary	GOOD. I SEE IN WAR IRAQ ALL MANY **IN WATER** DIE BECAME OIL KILL FISH BRID ALL DIE.....
31	Ali	I SEE TV WAR IN IRAQ OIL

[9] A P-level of 3+ means that the student uses two- or three-word signed or spoken utterances, primarily tied to the here and now. Uses a lot of nonverbal support for messages.

36	Teacher	Ali What happens to birds and fish in all that oily water ??/
49	Ali	I SEE TV IARQ IN WATER OIL OCEAN

In later ENFI sessions Ali began to write her own messages in response to the teacher's questions, but always with difficulty and with a lot of help from others in the class. In her fieldnotes for the session on 2-4-91, the research assistant wrote, "Ali's still struggling with her part, and it seems she hasn't sent out her message yet. I can sense her uneasiness since everyone is sending out messages" and later, "I now see Ali has been reading her own paper [something she had written before the ENFI session] about her own weekend activities. She has been working on her first paragraph since the beginning of the session." In that session, with spelling help from the teacher and research assistant and from the paper she had written before going to the lab, Ali wrote two messages:

i calen bed room' i my with sister fun
i nintendo enjoy fun;
josselym my sister and alfson and i wten to wail
to go movie [LOO WHO'S TALKING TOO] I WTACH TO I GO TO HOME

****

MATHER MY JOSSEILN SISTER AND AFLSON AND I CAR GO TO MOVIE [LOOK WHO'S TALKING

In the ten sessions that Ali participated in on the network before the end of the year (from 1-14-91 to 5-6-91), she gradually became more independent in her writing. She still struggled with everything she wrote and wrote much less than the other students, and she still asked for help with spelling many words and understanding what others had written, but she only asked for help with one or two words per message, thought of her contributions on her own, and elaborated in response to questions. For example, on 3-18-91, Cathy asked the students what they had done during the weekend, and Cathy's questions to Ali led her to give more information.

<u>3-18-91</u>

Cathy	HELLO EVERYBODY . HOW ARE EVERBODY ? WHAT YOU DOING EVERYDAYS WILLIAM AND MARY AND ALI AND HEATHER. WHAT YOU DOING ON YOUR WEEKEND ?? I AM TIRED TODAY.

Ali SAT I HOME IN BAD ROOMED IO ON TV GAME LONGSED I SICK SPEE

[According to the research assistant's notes, Ali asked for help with spelling "game," "long," and "sick"]

Cathy ALI YOU HAVEA FUN WITH YOUR FAMILY ??

Ali ALI I liKe my family

[Ali asked for help with spelling "like"]

Cathy ALI YOU LIKE OF YOUR FAMILY FROM SOUTH AMERICANS ? YOU WILL MOVE TO SOUTH AMERICANS ??

Ali I DON'T KNOW MOVE EL SALVADORE

On 4-22 Ali gave an account of something that happened at home, and with Cathy's prodding, expanded on her account, even picking up on Cathy's spelling of "brother."

4-22

Ali firda I WITH BOYTHER FIGHTS PLEASE SOTP YUO BOYTHER

Cathy ali please again i not understand of your answer okay you need senctnce!!!!!!

Ali CATHY SO FRIEND'S HOUSE TODAY?

Cathy ali please you answer of me now !! what means your brother fight with you what means . so when you fight wiht your brother ???

Ali I MAGAZINE READ BUT MY BROTHER TOOK IT I GOT MAD MY BROTHER FAULT MY BROTHER FIGHT WITH ME

On 4-29 Ali responded to the question about her weekend, gave clarification about which book she was reading, and began to focus, with Cathy, on that topic.

4-29

Cathy	hello ali. how are you ???? i feel whoops today frist time today!!!! what you doing weekend and taking about friend weeknd of ??
Ali	SAT I BOOK READ " CRZAY FOR YOU" LONGED GO ROOM dEB SLEEP TIRED MY WEEKEND
Cathy	I UNDERSTAND OF YOU .. ARE YOU READ OF TITTLE OF BOOK "THE CRAZY FOR YOU " i ,AKE LAUGHER TO YOU FUNNY STORY BOOK YES !! DID YOU SAW BOOK NEW KIDS ON THE BLOCK??????????????????????
Ali	NEW KIDS ON THE BLOCK "NO" BUT "the CRAZY FOR YOU BOOK READ YES ANOTHER HAVE BOOK READ NEW KIDS ON THE BLOCK ,
Cathy	ALI WHAT SAY NEW KINDS ON BLOCK .. BUT DONNIE STILL JAIL????
Ali	I DON'T KONW NEW KIDS ON THE BLOCK BUT NO DONNIE
Cathy	OKAY BETYTER !! YOUR BOOK " THE CRAZY FOR YOU" WHAT KIND OF IN BOOK READING STORY ? WEHAST KIND OF TOPIC ?? ALL RIGHT . NO PROBLEM !!!!

[Cathy is now focusing on the book, asking for discussion of what it was about. But the class ended, so Ali didn't respond.]

In the class interview at the end of the year Ali said that she still preferred face-to-face, ASL interaction to writing on the computer: "I don't like having to depend on others for assistance when I always understand through signing." But still, we can see that she made tremendous progress in her ability to participate in network conversations independently.

More Advanced Students

The second group of three students comes from Leslie Brewer's class of seven students, who were 12-15 years old at the beginning of the school year. These students were in the academic track of the Special Opportunities Program, which focuses on developing school- and job-based literacy skills, but the classes move more slowly than the regular classes, and less content is covered. The goal for many of the students is that they will eventually enter the regular academic program (which all of Leslie's students did at the end of the following school year in 1992, when they went to the Model Secondary School for the Deaf, MSSD, also on Gallaudet's campus).

Leslie's general educational goal for these students was to understand and respond to each one's level of functioning, socially and academically, and to design an individualized program appropriate for each student. Her purpose for ENFI was to develop their problem-solving skills in order to improve their ability to function effectively at home, at school, and in their community. She also wanted to give the students opportunities to write for a purpose, to express ideas they wanted to express, to others who needed and wanted to understand what they had to say, and to see what other students were writing. Her long-term goal for their network interaction was that the students would begin to interact on the network not only with her, but with each other as well.
The class met on the network for one 45-minute session each week (unless other school activities intervened). This session was preceded by a 20-minute preparation session (in sign language) and followed by a 25-minute follow-up session for revising and editing what had been written on the network. Leslie believes that two ENFI sessions per week would be preferable to one, but curricular demands and other school activities made that schedule nearly impossible for her.

On the network, the class often had open-ended discussions (about upcoming or recent holidays, events in the news, or issues that individuals in the class were dealing with), but the primary focus of the discussions was on problems that Leslie, the classroom aide (Barbara Hunt, referred to as "Hunt" in the transcripts), or a student posed, and on offering possible solutions to the problems. Leslie wanted the students to recognize and understand a problem statement when it was presented in sign language and in writing, to be able to state a problem clearly themselves, propose clear and reasonable solutions, react appropriately to what others wrote, and expand on what they and others had written. She also wanted them to relate what they did on the network with stories in their reader that had problems and solutions, so they could recognize problems and solutions in their other reading.

Leslie or the aide presented a problem to the class--either a problem they had observed among the students or one that a student brought in (the problems used throughout the year are shown in the section on "ENFI activities at Kendall"). Barbara signed the problem in

ASL, and then Leslie signed it in signed English. The students, in sign, restated the problem and proposed solutions. Then the class went to the computer lab, and Leslie or Barbara wrote the problem on the network, and the students proposed solutions in writing.

All but two of the students had used ENFI the year before, so they were familiar and comfortable with communicating with each other in writing on the network and quite proficient at reading and writing messages.

As is often the case with beginning writers, the development over a year's time is more striking and obvious among Heather's students, discussed above, than among Leslie's. Leslie's students started the year with a lot of experience with writing on the network and with much more proficiency with written English, so their writing development over time is more subtle and harder to track.

It is also more difficult with Leslie's students to know how to attribute the patterns and the change that we do observe, because it seems that both the teachers' strategies and the technology were powerful influencing factors. While Heather's students participated in essentially the same activity all year long (answering questions about their weekend in a one-on-one interaction, with the teacher or another student acting as "teacher"), the basic character of the discussions themselves in Leslie's class changed considerably over time. The teachers and the way they conducted the sessions, as they gradually learned what did and didn't promote the kind of discussion they were looking for, seemed to change as much as the students' skills.

For example, at the beginning of the year the problems presented involved simple matters of communication. They seemed almost too easy to answer, and the students seemed confused as to what they were to write about. The situations had not actually happened to anyone in the class, but were created from situations the teachers thought the students might face. For example, the following problems were among those posed in the first few ENFI sessions.

Your mother sent you to the store to buy milk. She wants chocolate milk. You looked and can't find it. You will have to ask for help. The sales clerk is hearing. How will you ask for help?

Your family is having dinner at your grandparent's house. Everyone is dressed in their best clothes. There is lots of food on the table. You are sitting next to your grandmother at the table. She is deaf, too. You want to ask for more turkey. How will you get her attention?

You are at the school library. You can't find the book you want. You must ask the Librarian for help. What questions will you ask?

You are watching T.V. at a friend's house. The program started before you and your friend got there. Now the commercial is on. Ask your friend's father what happened. Ask him many questions.

You are at school. You feel sick. You go to the nurse's office. Tell the nurse what hurts. Ask the nurse what to do.

You go to New York City for the first time with your family. Your family has never been to New York City before. You want to go to a nice restaurant to eat. Who would you ask for information?

The students didn't seem to realize that they were to discuss how to get some simple information, and instead, they gave accounts of their own experiences with Thanksgiving dinner, being sick, or going to a new city. For example, the following were among the responses to the fifth problem shown above, about being sick:

MikeIn long time ago i want old school in new jersey i fell down a break arm then i going to nurse ask nurse said what happen then i told to him i fell in big building on ice in winter then the supervisor take a hosiptal then the hosiptal will put on my arm of white with cast then . . .

Sallykids pull kick me fell srcape a floor and I very hurt my leg and blood I tell to Jeff and I say please you write to pass hurry I go to a nurse. and I want talk to you explain to me what happen . and I tell ex plain to you about kids pull kick to me at recess and she say oh, ok and she give to me some ice cold . . . .

JaneI go to play out and I want my friend talk want play out and but boy play out then boy play run not look at to me that boy be accident then to me be falls on floor and my leg be hurt and blood . I tell to aide and i said want to needs to nurse . aide said ok needs wrtie for pass to nurse . . .

Second, the teachers started the year focusing at times on the form of what was written rather than on the content, as is evident in comments they made on the network--"Mike, is it better to say I fell down and break my arm or I fell down and broke my arm?" "Jessica, never say ain't, always say isn't he cute." "Sally, remember to spell all names with a capital letter; Bill, Leslie, and Jessica. Do you know how to make capital letters?". By the middle of the year, the teachers had decided that the network was the place to focus on meaning, and form could be fixed later in editing sessions (1-28-91 - "Please don't worry about spelling. We can work on that later. Remember we will edit our work later today. Just write what you feel and think about the problem.") This shift in the teachers' attitude no doubt influenced the students' feelings about what was important during the network writing.

Finally, the technology itself made it difficult to concentrate on the problem at hand or to read and comment on what others had written. The continually-scrolling messages very quickly pushed previous ones, including the problem, off the screen (the technology now in use at Kendall has a special window in which a problem statement can be placed and held throughout the discussion). As the year progressed, students may have gotten used to this feature of the technology and become more accustomed to remembering what had been written, without needing to see to it in order to respond.

Whatever the causes, probably a combination of improvement in students' skills and these other factors, we did see change in the students' network writing during the year. In the whole class there was a general shift from writing only with the teacher to writing and discussing with each other, responding to and expanding on each others' comments. Leslie wanted the students to interact with each other about the problems, and not only with her. They interacted with each other some even at the beginning of the year, but only about personal topics, such as who had won the football game or who would spend the night at whose house, and not in relation to the problem; to this kind of personal discussion they were very attentive. At one point Leslie became frustrated; the students clearly loved writing on the network, but she wondered whether they were learning anything.

In mid-November, however, a week before Thanksgiving break, the character of the discussions changed. Leslie posed some questions related to the students' actual experiences, such as:

You will have friends over for Thanksgiving dinner. What time will you serve dinner? Who will you invite? What will you eat? What will you talk about at the dinner table? Will you enjoy yourself or will you feel depressed?

The students were focused on and involved in the discussion throughout the entire session. Their personal narratives were entirely appropriate now, and they all told their stories and then asked each other questions about what they had written. For example:

Mike(at the end of a long account) . . . my costum will come to my grandparent house then in between bruch lunch and dinner between all my family and pets is dog will eat a turkey and all stuff and homemake ice cream and cake and pies and all family get very full and maybe get fat . . .

Jessica it's a great turkey".

Sarah That's a great meal a turkey.

Linda Mike.. What will your family do when they finish eating all the turkey and pies and cakes and ice cream?

Mike WHEN FINISH ATE A THANKSGIVING WITH MY FAMILY THEN WE TALKING THEN WE GO TO HOME THEN SAID GOOD BYE TO MY GRANDPARENTS

I think this discussion of Thanksgiving dinner was a watershed experience for the teachers and the students. The teachers had finally found a topic that the students were really involved in, interested in, and able to write about, and Leslie also began to accomplish her goal--that the students would respond appropriately to each other (something they were eager to do anyway, but about their own topics) and push each other for clarification and elaboration.

From this point on, the topics and problems presented were much more relevant to the students' experiences, and the discussions were much more focused. Less personal topics (the war in the Middle East) and more abstract ideas (anger, death, deaf culture, handicaps) were discussed, students began to bring in their own problems that they presented to the class in sign language and in writing on the network, and they wrote much more regularly and clearly in response to each other.

For example, on January 28, before Leslie introduced the problem for the day, the class briefly discussed the war in Iraq. Students made relevant contributions and attended to what the teacher, as well as other students, wrote.

Teacher Good morning class how is everything? I hope we will have a good class today. I saw on 60 minutes that the war is still going on in Iraq. Now, there is oil in the gulf and many birds and fish will die. I hope this war will end soon. How are you feeling this week?

Sarah Hello Vincent, What do you think about still war in Iraq? Birds and fish will die from oil in gulf.

Vincent Hello Teacher, yes i watch some on tv find news all yes i see on tv on oceae water oil !

Mike Dear Leslie i not watch 60 minutes i hate to 60 minutes i like to watch a super bowl football yesterday . i real sad to fish and bird real died.

Sally hello, leslie , I am fell ok and I ask to you about you saw on T.v war . and Iam real sad fish and birds was died. 60 minutes.

Some students (Sarah in particular, as discussed below) began to pose their own problems, first in sign language and then in writing on the network.

In the final problem-solving session, several students gave relevant solutions, after some discussion of the problem itself.

4-29-91

Teacher — There was a spelling test with very hard words. A boy in the class wrote some of the words on his hand, and the teacher saw it when he was tying his shoelace. She said he was cheating. The boy said that he did study, but he gets nervous in tests and didn't want to forget the words. How should he get ready for tests? What can he do so he doesn't cheat?

Linda — He need to review his work,prctice and studing the words until he remeber.

Jessica — The boy's parent can teach to him how to learn spelling words and He won't be nervous when He got A's

Sarah — I help him to do homework for study spelling words or he try to ask his parents for help.

Sarah — I can share with him to do hoework for study spelling words or explain about spelling words. Quiz on firday.

Sally — . . . he ask your friend will help at him . your friend will taugth about hes' homework . he go to over yourfriend s' house he work study with your friend for homework.

In the class interview at the end of the year, several students said they had improved quite a bit in their two years on the network (These comments are translated from sign language).

Sarah — When I was with Dayna Brown [the previous school year], I didn't really understand anything on the computer. She helped me and taught me about the computer. Now I can really chat with anyone in longer text, write sentences, solve problems, and tell about weekend activities.

Sally — I was able to ask the teacher what she means on the computer. Now I am much more comfortable. I can fill in information and be more clear.

Linda — I was confused with writing sentences. I kept on erasing my sentences and repeating what I was writing. Now I still keep repeating, but I understand and I keep on thinking. I write more sentences now, and I am learning to write proper sentences as I keep on writing.

Jane — The teacher guides me on ENFI. Sometimes I get confused. It is effort, experience, and time that allow continual improvement. Improvement comes from being able to understand more and do more. . . . Last year I was not sure where the letters and numbers were. It was different, and I had a hard time understanding everything. With help from the teacher, I became more familiar with it. Now I am more experienced, and I understand more, I communicate more, my spelling and capitalization are better, and I know how to scroll. I really understand a lot more with all my experience.

Development of Individual Students

It is more difficult with Leslie's class than it was with Heather's to single out patterns of development particular to individual students, because the discussions took place much more among the whole class, while Heather's conversations remained one-on-one throughout the year. Leslie's class worked together and, in many ways, changed together. However, the students are still individuals with different language backgrounds and proficiencies, and we can see individual development to some extent. The three students discussed here were selected by Leslie to show a range of proficiencies and involvement in the network activities, moving from the least to the most socially and educationally mature and proficient in English.

Jane

Jane was 12 years old at the beginning of the school year, and had attended Kendall School since she was 2 1/2 months old. Her parents are hearing, but her mother signs well. Jane expresses herself clearly in sign, but still has difficulty processing and producing print. She had used the network the previous year in Dayna Brown's class and could write coherent messages and read those of others, but she was primarily interested in typing quickly and writing a lot.

At the beginning of the year, Jane sent very few messages on the network. She spent a long time composing, erasing, and recomposing, and what she finally did produce was nearly incomprehensible to the other class members, including the teachers. For example, in early

October, the class' second ENFI session, she wrote the following, her only contribution, sent at the very end of the session, in response to a problem about watching a TV show:

Teacher — You are watching T.V. at a friend's house. The program started before you and your friend got there. Now the commercial is on. Ask your friend's father what happened. Ask him many questions.

Jane — LESLIE , I SAID NO MY FIREND 'HOUSE ON WATCH TV NO SORRY OK AND MY FATHER NOT GO TO FRINED ' HOUSE NO NEVER I TOO NEVER NO SORRY OK MY FATHER AND MOTHER FRIEND OVER MY HOUSE WATCH ON TV YES. MY FATHER AND MOTHER WANT WATCH ON TV WHAT HAPPEN ON TV NEWS YES . MY MOTHER AND FATHER NOT GO OVER FRIEND'HOUSE NO SORRY OK . MY BOTHER GO OVER GIRLFRIEND ' HOUSE YES ME NEVER MY BOTHER 'S GIRLFRIEND 'S HOUSE NO OK.

In another session in October, when the rest of the students were reading another student's solution to a problem and responding to it, Jane spent the entire session writing one long personal narrative that she sent to the class in two chunks. She didn't even seem to realize that the activity had changed midway through the class from writing one's own account to responding to that of another student. At this stage, Jane seemed to be producing essentially "egocentric" language (Vygotsky, 1962) to handle the writing task, and she seemed oblivious to what others were writing.

By January, Jane was much more in tune with what the class was doing on the network. Her contributions were still not completely comprehensible to the teacher and her classmates, but they were on topic and related to what others were writing and asking. For example, in the following session (only parts of which are shown) she made five contributions, each one relevant to the discussion.

1-23-91
(Discussing the war in the Middle East)

Teacher — I think there are six soldiers in all that were caught in Iraq and they did not seem very happy. What do you think Saddam Hussein should do with the men? Do you think he should give them back to the United States? Do you know that we have many of their soldiers?

Jane — HI LESLIE , I said what happen on yesterday on tv "ABC NEWS" that man from usa and italy and fance form in iraqi that people in jail yes man people

that thing in from yes that peole that very hurt yes i see on tv "abc news" yes.

Teacher — How many of you can list the countries found in the Middle East? Please list them for me.

Jane — hi leslie , i said that mary daffert that iarn, iraq ,, tukey , israsel and saudi arbara that marys that people for army .

Teacher — Girls (Sarah, Jane, Linda, Jessica) - Interested in joining the army and fighting????

Jane — HI LESLIE, I said can't join to girl army no sorry why beause that people that deaf can't let't go to war from iraqi not know that people that deaf be hurt and die that for war i said no way ok.

Later in the year, Jane was often absent because of health problems, so we don't have many records of her participation and cannot follow her progress further. However, it is clear that she had a general understanding of what the problems were and was able to provide relevant and relatively clear responses, as she did in the following session in April. (She misunderstood the way that the boy cheated, thinking that he had written the spelling words on the bottom of his shoe, and she didn't suggest a solution, but she did understand the problem and the consequences.)

4-29-91

Teacher — There was a spelling test with very hard words. A boy in the class wrote some of the words on his hand, and the teacher saw it when he was tying his shoelace. She said he was cheating. The boy said that he did study, but he gets nervous in tests and didn't want to forget the words. How should he get ready for tests? What can he do so he doesn't cheat?

Jane — HELLO , I said that the boy have a cheat for test yes but that beause not know spelling words , boy good idea can we so cheat have a under for spelling words in the shoes for test then relly spelling test the teacher tell really spelling test , boy said ok not then the teacher glacne to boy was cheat under the shoes will d.h. that beause .

Mike

Mike was 12 years old at the beginning of the school year, a relatively new student who had just come to Kendall the previous year. He had been in several oral programs before coming to Kendall. His parents are hearing and do not sign, so he has no opportunity to sign at home. To communicate with his family and hearing friends, he relies completely on his hearing and on lip reading.

Like Jane, Mike had used ENFI the previous year, so in some ways he was ahead of the students in the class who had not. Even at the beginning of the year, he wrote fluently on the network. He did not always understand (or maybe he didn't care) what the teachers asked him about or asked him to do, but he wrote a brief reply to each problem presented and each question he was asked. These replies were, however, very brief and his answers obvious and uninformative, almost as if he didn't see the point of writing them. He seemed eager to get them over with so he could write personal messages to his friends, which followed almost every response to the teacher. For example,

10-4-90

Teacher You are at the school library. You can't find the book you want. You must ask the Librarian for help. What questions will you ask?

Mike If some one can t find then ask librarian for help find book about football.

Mike Dear vincent I have a football book at my home about 2 or 3 redskins book.

****

11-5-90

Mike Dear hunt, Mrs leslie here and heather too last friday. We all class last friday afternoon they has a video about sleppy beauty with deaf man.

Teacher Mike, that sounds like an interesting story. What was it about?

Mike Dear hunt the man are deaf about story of sleppy beafuty and many different kind a video and many different story.

Teacher Mike what was the story about the deaf man about ??

Mike Dear hunt many different kind video sleppy beafty and another movies i don t know name video ok.

At the same time that he was adding no new information to this conversation, he was engaged in conversations with several other students about other topics.
This may be why in her interview, Leslie said that at the beginning of the year Mike wrote very little on the network, and it was like pulling teeth to get him to write anything. In fact, he was quite an active participant and loved to be at the center of conversations with the other students, but he wasn't interested in the discussion topics the teachers proposed, and wrote about other things instead. (This points to a valuable use for the transcripts--teachers can check, and confirm or revise, their perceptions of what students are doing on the network.) When he was interested in a topic, Mike wrote long narratives (a very long account about what he had done on Thanksgiving, for example). As the year progressed, he engaged in several extended discussions--about both personal and more academic topics, with both the teacher and other students, as these two examples show.

12-17-90

Mike Dear Linda want you real a gymathnas vs than girl?

Linda Mike, No I don't think so because I 'm not a gymnastics anymore and now I'm a ice skater why because the gymnatics is over.

Mike Dear linda you will race with girls at ice skate ? when you will race a ice skate ?

Linda Mike, no I don't race the girls beacuse I have a contest who can do fiuqre the ice skate.

Mike Dear linda why you not contest with girls.at ice skate what you do at ice skate

Linda Mike, I really love ice skate my job is to teach my older cousin and I have to teach my young cousin and my setp sisters and my step brothers too.

3-11-91

Teacher . . . At my meetings, people said they wanted teachers to teach in ASL. What do you think?

Mike . . . must learn with asl with sign language with from english . . . my mother need practice with sign some english and some asl. Became skill with sign language ok.

Teacher Mike, What signs to you want your mother to learn? Does anyone in your family use sign language?

Mike Dear hunt, But my mother learn alog sign language with words yes. my mother want learn practice sign and my father too.

Teacher Mike, What words do you want your mother to know in sign language?

Mike Dear hunt, Many word said good morning and good night and how are you ? and many words .

Teacher Mike, Vincent, Sally, If you were at a party that had many hearing kids and you were the only deaf person there, what would you do? Would you sit in a corner by yourself?? Would you try to communicate?? How would you talk to them??

Mike Dear hunt, i would talk with hearing them play outside at close at my home in last year sept again this year will play with hearing boys and few deaf boys and girls hearing that all. . . . i play with my hearing play that all ok with talk that all.

Teacher Mike how do you communicate with your hearing friends?

Mike Dear hunt i talk with hearing friend about do you want play football ok. and another children play ball ok ok ok.

Teacher If your friend did not want to play football what would you talk about???

Mike Dear hunt i talk with my hearing friend about different thing and different something ok ok ok ok. . . . i talk with my friend hearing what your name and how are you and how old.

Teacher Mike, That is a great start!

From the beginning of the year, Mike seemed eager to write on the network and to connect with and be accepted by the other students. I think the key to getting him to write productively was finding topics that he was involved with and interested in and that would at the same time allow him to feel accepted by the other students.

Sarah

Sarah was 13 years old at the beginning of the school year. Like Mike and Jane, she had used ENFI the previous year, where she was the most proficient reader and writer in the class. Although Sarah's parents are hearing, they sign a little. Her sister signs well and is often used as an interpreter within the family. Sarah's family communicates well with each other, they do a lot of travelling together, and her parents emphasize the importance of being able to read and write well. In short, Sarah comes to school with a great deal of social and academic support from home.

From the first ENFI session in Leslie's class, Sarah understood the activity and what the students were expected to do. She understood the problems the teachers presented, understood that a solution was desired, and provided reasonable solutions, even adding relevant information that was not asked for. For example,

9-27-90

Teacher Your mother sent you to the store to buy milk. She wants chocolate milk. You looked and can't find it. You will have to ask for help. The sales clerk is hearing. How will you ask for help?

Sarah Yes, She frsit ask for help and possbably to use asl or wirte paper. The sale clerk might became understand about that.

10-4-90

Teacher You are at the school library. You can't find the book you want. You must ask the Librarian for help. What questions will you ask?

Sarah I were at school libaray but I cannot find the book title "Coal" and ask the libaray help. I said " Where is title "Coal" and the libaray will help me show for wall books and can find for the book title "Coal".

Even when the other students wrote personal narratives instead of solutions to the problems (such as the visit to the doctor discussed above), Sarah responded appropriately to the problems and proposed reasonable solutions.

Like Cathy in Heather's class, Sarah gradually took on more responsibilities in the discussions. In January, for example, seemingly unprompted, she began several ENFI sessions with a question for the other students and followed up with those that responded, at times rephrasing what they wrote. For example,

1-23-91

Sarah — Hello everyone! How are you? I am fine. Why [what] do you think about three white men in Iraqi? Do you have any question?

Jane — yes , hi sarah , why beause that people from army that for war form iraqi yes but on yesterday on tv that man on iraqi tv man that for hurt yes that face form iraqi yes what happen hrut yes.

Sarah — Oh hi Jane, Three white men were landed from air force and over iraqi. Iraqi caught three white men are getting hurt.

Vincent — Yes Hello Sarah, Well I wonder so becuse other Iraq bad other people big gun bring look plane than three man oh no plane bronk than three man jump out deep on grass floor than other many army bad get three man go in jail wait 8 hour? I wonder so too but I see your newspaper and too very sad three man.

Sarah — Hello Vincent, that's it and three white men in jail and wait until eight hours. I don't see them get hurt. it's too sad about this.

She also took the part of "teacher" in some ENFI sessions, presenting a problem for the other students to offer solutions,

3-4-91

Sarah — I have a problem with christina last two week I went over sleep christina's house but I forget my T-shirt "Bart Simpson" and white pant i just called her on tdd, christina's father told her return my clothes then i told her many time she always forget to bring my clothes.

responded supportively to the solutions they offered,

Linda Sarah, Suppose Christina bother u and you forces christina ' s parents.

Sarah Linda, I will call christina's parents about return my clothes Maybe her parents mad at christina.

and prompted students who talked off topic to offer their solutions.

Mike Dear jessica why you ask to me about linda some one pick on me why you tell me to ok.

Sarah Mike, I don't know about that . . . Can you help for me? . . . what do you think solve problem?

Mike Dear sarah but i can t help with you ok .

Sometimes Sarah introduced new vocabulary on the network that had not been part of the discussion, but that the students then began to use on the network and the teacher used for discussion in a follow-up session:

3-18-91
[The class was discussing a problem the teacher had introduced related to going to the dentist.]

Sarah Hello everyone, When you go to the dentist? Or when you go to the orthodontist?

Sarah introduced the word orthodontist, which then became part of the class' discourse.

Essentially, by early spring, Sarah had accomplished Leslie's purposes for ENFI with this group, and had even progressed beyond them (at the end of the school year Sarah left Kendall to enter the regular program at MSSD; the other students in the class made this transition the following year). The challenge for a teacher at this point is what to do with this kind of student--how to interest and challenge her and move her along further. Interestingly, by late spring, Sarah was easily and proficiently accomplishing the tasks the teachers presented, and then going on to "chat" with other students about other things, something the teachers had worked hard all semester to move the students away from. For example,

4-29-91

Teacher There was a spelling test with very hard words. A boy in the class wrote some of the words on his hand, and the teacher saw it when he was tying his shoelace. She said he was cheating. The boy said that he did study, but he gets nervous in tests and didn't want to forget the words. How should he get ready for tests? What can he do so he doesn't cheat?

Sarah I have a good idea. I help him to do homework for study spelling words or he try to ask his parents for help.

Teacher Sarah: Yes, of course! How could you help him??

Sarah I can share with him to do hoework for study spelling words or explain about spelling words. Quiz on firday.

Teacher Great!!

From this point on in the transcript, the teacher continued to discuss with different students their solutions to the problem, while Sarah attempted to initiate conversations with different students about their weekend ("Hello Mr. Dangerous, Do you have a fun a weekend? Angus and you went to the carvinal. How long stay at carvinal?"), TV shows ("I finished watch TV show Flash last Satursday."), or anything ("Jessica, what's up?"). She might have been bored and looking for something to do, or she might have decided that since the other students were not going to write on her level, she might as well write on theirs.

Possible next steps with a student like Sarah might be to ask her more often to present problems on the network, to summarize and respond to different students' proposed solutions, or even to lead preparation and follow-up sessions, using the transcripts. Or she might have been placed with a different, more advanced group of students for ENFI discussions, where she would be challenged and interested. Whatever the next steps, it is clear that Sarah was ready to move on to more advanced work.

Conclusion

The six students studied brought different language proficiencies to the network interactions and developed in different ways, but some general patterns are evident in their development over a year's time. They tended to

- feel more comfortable and confident with written English, at least with network writing, and more motivated to do it;

- engage more in discussions--with the teacher and with each other--asking and responding to questions, seeking and providing clarification, continuing others' topics, and elaborating on their own contributions so they were clear to others;

- become more independent (especially those who sought a lot of help early in the year), writing their messages without as much prodding and sign language support.

The network writing seemed to develop and reinforce some important conversational skills, like initiating topics, staying on topic, requesting and providing clarification, elaborating, and asking and responding appropriately to questions. It also provided opportunities for attending to and modeling language for peers, that may not always happen in the classroom.

At the same time, it is important to note that network writing does not represent all of the reading and writing that these students did or could do in English. This writing is produced relatively quickly, without a lot of time, revision, reflection, and revision. Many of the students were able to, and did, write more focused, extended texts with proper capitalization and punctuation, in other contexts. Network writing is <u>one</u> valuable kind of writing, among many others that students need to be involved in.

INSTITUTIONALIZING ENFI AT KENDALL SCHOOL

Judy Lenard

Background of ENFI at Kendall

ENFI as an instructional tool for teaching reading and writing using computer technology was developed in 1985 at Gallaudet University by Drs. Trent Batson and Joy Kreeft Peyton. At Kendall, it has been used since 1986, when JoAnn Mackinson took the first elementary school class to Gallaudet to use their network. At that time, Kendall was undergoing a shift in language instruction toward a curriculum that emphasized whole language principles, and ENFI was seen as a potential tool in implementing the whole language approach. In 1987, through a Gallaudet Presidential Award to Mackinson, an ENFI network was set up at Kendall and several teachers began to use ENFI, but without any systematic curricular support or evaluation. In 1989 Peyton worked with a team of Kendall staff to develop a study to document the application of ENFI as an instructional tool for literacy development at Kendall.

During the 1989-90 school year, with funding from the Literacies Institute in Boston, Peyton conducted a descriptive study of the uses of ENFI at Kendall. The study was designed to be non-intrusive, using naturalistic research methodology. She worked with three Intermediate and Middle School teachers--Dayna Brown, Marsha Morales, and Yetti Sinnreich--and she and Anne Marie Baer observed ENFI classes and classroom activities related to preparation and follow up of ENFI, videotaped classes, interviewed teachers and students, and collected ENFI transcripts.

This work paved the way for the current project, Teaming With Text (TWT), which has documented and described the applications of ENFI Kendall that reflect the whole language principles and processes that are central to Kendall's language arts curricular goals.

Goals of the Teaming With Text Project

As described in the grant proposal to the Department of Education, the goals of the Teaming With Text Project were to:

Develop and test a set of ENFI practices for deaf students, ages 11 to 15, which will enhance whole-language instruction for reading and writing and which can easily be transferred to Gallaudet's national constituency in deaf education.

At early project meetings, the project's administrative team determined that the three central questions guiding our work would be:

- What general factors appear to contribute to the effectiveness of ENFI as an instructional tool in the development of reading and writing skills of deaf students?

- Do ENFI activities act as scaffolding across modalities in the development of literacy for deaf students?

- What role does ENFI play in the use of interactional scaffolding (by teachers) and the development of audience awareness (in students) in writing instruction in deaf students?

(These questions are excerpted from TWT team meeting summaries prepared on 1/31/91 and 3-11-91).

Managing the Teaming With Text Project

Managing the TWT grant at Kendall involved primarily coordinating the activities of the teachers involved in the research. In the first year, seven teachers were involved: Leslie Brewer, Babs Kaufman, Barbara Hunt, Heather Jilao, Marsha Morales, Yetti Sinnreich, and Ann Sullivan. Since the grant activities had to fit smoothly into the ongoing program of instruction, the participation of teachers had to be planned to fit within their teaching responsibilities.

Two types of teacher involvement predominated the study: consent for researchers to observe and document what was happening in their ENFI classes and related classroom work, and participation in a series of discussions with the research team. The observations took place within regularly-scheduled classes, either in the ENFI lab or the teacher's classrooms. The group discussions were held at lunchtime or after classes. Teachers were compensated from the grant for time they spent on grant activities beyond regular working hours.

A primary focus of the discussion group meetings was the unique contributions of ENFI as an instructional tool for developing deaf students' reading and writing abilities. Part of the success of this project has been the opportunities it has provided for the teachers to get together with researchers and other staff members to discuss their experiences and to raise important questions about the role of ENFI in the development of English literacy of deaf students.

In the first year of the grant, these discussions led to a number of recommendations to PreCollege Programs Administration (which includes Kendall and MSSD), related to needed equipment to run and accompany the ENFI work, teacher training, and policy implications. These recommendations have formed the basis of a concerted effort to institutionalize ENFI

at Kendall by integrating the findings of the research into its instructional, curricular, evaluation, and dissemination structures.

Equipment

- Upgraded ENFI software, Realtime Writer (RTW), should be installed in the ENFI lab
- A whiteboard and overhead projector should be placed in the ENFI lab

Teacher Training

- All interested teachers should have the opportunity to receive training in using ENFI as an instructional tool and to use ENFI with their students
- All teachers who currently use ENFI need training in using RTW
- Teachers interested in learning about specific ENFI activities and strategies should be given opportunities to work with teachers experienced with those activities and strategies.
- Teachers should be given time and opportunities to view new computer software and hardware as it becomes available to Gallaudet
- Faculty and staff using ENFI should have opportunities to meet periodically with each other and others interested in ENFI to discuss and share their experiences.

Policy Implications

- The PreCollege Programs administrative staff should support the use of ENFI in the classroom by providing necessary resources in the form of time and materials for the teachers involved;
- The relationship of ENFI to the concerns of the three core competency groups--Whole Language, ASL, and Students with Special Needs--needs to be further explored.
- Current and future efforts to develop and revise curricula should include ENFI, when appropriate.

- Technical support including hardware, software and training opportunities need to be available.

- Responsibility for ENFI functions (hardware maintenance, training, curricular documentation, and integration of ENFI into the larger program) should be clearly designated as part of the specific job responsibilities of specific individuals.

- Faculty and staff using ENFI with students should be supported in taking leadership roles in training, curricular efforts, outreach activities, and determining future directions for ENFI at PreCollege Programs.

(These recommendations are excerpted from a memo on 8-5-91 to Kendall's administration.)

All of these recommendations were approved by PreCollege Administration.

The Importance of Teacher Involvement in the Project

Teacher leadership has been central to the success of this project. For example, on September 27, 1991, five teachers who are regular ENFI users conducted a workshop for all interested faculty and staff at Kendall. The presenters described their instructional strategies on ENFI and the results of their experiences. In several cases they shared transcripts and writing samples to show students' progress. Approximately 25 faculty and staff attended, and as the workshop evaluations clearly show (the evaluation report from the workshop is available as Appendix 4), this workshop was rated very highly by all of the teachers and aides attending.

Partially as a result of the teacher enthusiasm generated by the workshop, 22 teachers and aides from Kendall were trained to use the RTW software in the fall of 1991. This software was installed because it offered many powerful features that were not available with the old software. The teachers who were regular ENFI users the year before had specifically requested a software that could provide advantages such as more sophisticated printing, ease in separating students on different channels, a special window that would hold text in place, etc.

Unfortunately, the decision to install RTW has presented the biggest obstacle to expanding ENFI use at Kendall or disseminating information about ENFI beyond Kendall. The RTW software proved to be so complex and temperamental that even veteran ENFI users were discouraged. Our original plans to provide teacher training and support through the Fall of 1991 and to start the teacher discussion groups again in January 1992 were never carried out, because the RTW software presented ongoing difficulties with learning even basic functions,

such as opening and closing the class and printing. These problems continue to the present. Neither the TWT project staff nor the ENFI users have had the time or energy to continue discussions of ENFI use on a group basis.

In April 1992, the TWT staff decided to temporarily place a part time lab assistant in the ENFI lab to help the teachers and students and to systematically document the problems that were encountered. The TWT group is also actively searching for alternatives to the RTW software. The staff at Clinite, the school in California that collaborated in this project, has reported similar problems with RTW (see the section on "Implementing ENFI at Clinite").

The irony of the problems encountered with RTW is that none of the teachers are using any of the advanced features that made RTW so attractive in the first place. At this point, we are concerned about the long-range implications for dissemination of ENFI to other schools. The complexity of RTW for an elementary school population undermines the clearly demonstrated value of ENFI as an instructional tool for literacy development.

It is a tribute to the power of ENFI as an instructional tool that eight Kendall teachers have persisted with ENFI, and used it on a regular basis this year, despite the problems with RTW. Of these teachers, only two are experienced ENFI users, and the other six are new to ENFI this year. We feel, therefore, that ENFI has been fully institutionalized as an important instructional tool for literacy development at all levels at Kendall. We have a solid core of dedicated ENFI teachers, and their work and the findings from this project and the previous ENFI work at Kendall have been incorporated into the curricular, instructional, and administrative policies and practices.

IMPLEMENTING ENFI AT CLINITE

Antonina Cardinalli

Throughout this project, we collaborated with the William D. Clinite Center for the Hearing Impaired (Clinite) in Tulare, California to implement and study the use of ENFI in a school that was in the beginning stages of implementation. We felt this collaboration was necessary to understand what the initial ENFI experience would be like for most schools. By the time this project started, ENFI was relatively well established at Kendall. The computers and network were in place and had been in operation for three years, there was ample technical support, and there was a small group of experienced ENFI teachers.

In contrast, the Principal of Clinite (Rich Graham) had only recently heard of ENFI, received a grant which allowed him to buy five computers and the necessary networking software and hardware, set up an ENFI lab, and gotten the network going. Therefore, the Clinite experience provides us with valuable information about the successes and problems involved in the early stages of implementing ENFI and the level of administrative and technical support and teacher training necessary. The full implementation report from Clinite is available as Appendix 5. This section summarizes the highlights of that report. Also available, as Appendix 6, is a Teacher's Activity Guide, a set of ENFI activities developed at Clinite for use with deaf elementary school students.

Clinite is a self-contained school for deaf and hard-of-hearing students, grades one through eight. Two schools for hearing students are adjacent to Clinite, an elementary school with grades kindergarten through five and a middle school with grades six through eight.

For the past few years, the students from the three schools have come to the computer lab at Clinite for one period a day to work together on a number of computer activities. When ENFI was set up, in the fall of 1990, one day a week the computer activities involved ENFI, using Realtime Writer software.

Clinite's ENFI approach is considerably different from Kendall's. At Clinite, a deaf and a hearing student (from first to eighth grade, 6 to 14 years old) are paired at each computer station. The primary reason for this pairing is that there are not enough computers for everyone to work alone, but another reason is so the two students can get to know each other and learn from each other--the hearing students can learn sign language from the deaf students, and at the same time they can provide an English language model for them when they work together on the network. Sometimes the students simply interact in writing with their partner at the same computer, and sometimes one pair interacts with another pair at another computer, working on the same channel.

The ENFI project staff at Clinite consist of the school principal, a teacher, a lab aide, a research assistant (trained in education of the deaf), and two technical support people. The principal kept the network going and solved technical problems when they came up. The

teacher developed ENFI activities appropriate for the students involved, and the lab aide ran the ENFI sessions. The research assistant collected background data on the students, observed ENFI sessions once a month, collected all of the ENFI transcripts, interviewed the Clinite staff and students, and met regularly with the staff and twice with representatives from the Kendall project staff. The technical staff provided backup help when the principal was not available.

The Clinite staff believe their ENFI project has been a tremendous success. They have made ENFI part of their regular curriculum, have developed a set of activities that work well with their students, and believe they have witnessed definite improvements in the deaf students' written expression and cognitive abilities, as well as in their self-confidence as writers. The students became increasingly adept at open ended discussions on the network, and the network activities became increasingly more demanding. By the end of the year, some of the students were collaboratively completing story or writing their own versions of stories told in sign language.

At the same time, Clinite has experienced some problems and identified some important issues as well as areas of success. From these experiences, they have compiled a list of recommendations for future ENFI users, which are summarized here:

- Clinite experienced many technical problems, including difficulties with understanding the Realtime Writer (RTW) users' manual. Several calls to Realtime Learning Systems (the developers of RTW) were necessary, as well as additional technical support from the county's data processing department. If schools continue to use RTW for ENFI, the documentation and support from Realtime Learning Systems need to be improved.

- The login and logout processes on RTW are complicated for students and teachers and need to be simplified. A simple, step-by-step operating manual to help teachers log in and out of the network and print transcripts is necessary, and was developed by the principal at Clinite.

- Initial support from a computer expert in the county office and ongoing support from the school principal were essential to ENFI's success. Without that support, the teacher and aide trained to use ENFI could not have kept it running.

- The software used for ENFI needs to allow the option of writing partners working on the same channel to see each others' messages as they are being produced, rather than simply after they are composed and sent.

- A curriculum specialist needs to work with classroom teachers to develop ENFI activities, and there needs to be sufficient planning time to develop, evaluate, and revise the activities.

- Students work much better when they work alone at a computer station, rather than being paired at a station with another student. They don't get as bored waiting for a turn to type, they feel more responsible for their own writing, and they are able to express their thoughts more freely, without the immediate influence or interference of another person.

- The Clinite staff attribute much of their success with ENFI to the fact that they began with highly structured activities, due to the low English literacy abilities of their students. It may be that young students, or those with limited English proficiency, need to begin with highly structured ENFI tasks and gradually move to more open ended ones.

- Sufficient class time needs to be devoted to off-network activities--planning and explanation of ENFI activities, brainstorming of ideas, and followup in the form of discussions, rewrites, and editing.

DISSEMINATING ENFI BEYOND KENDALL AND CLINITE

Margaret Hallau

During the 18 months of the TWT Project, teachers at Kendall and Clinite have been learning how to make ENFI a viable instructional tool. What they have learned has been presented at national conferences, including Teachers of English to Speakers of Other Languages in 1991 and 1992 and Educational Applications of Technology for Deaf Students, Rochester, New York, 1992. At these conferences and in response to requests, we have distributed information about available software and hardware for ENFI, effective ENFI strategies, and project findings. We have also made available to educators and administrators interested in ENFI an extensive annotated bibliography of articles published about ENFI, primarily at the college level (available from the Gallaudet University ENFI Project), and a comprehensive teacher manual for using Realtime Writer, the ENFI software used at Kendall (Biel, 1989).

Our major product for disseminating information about ENFI at the elementary school level will be a teacher manual developed and produced by Kendall's PreCollege Programs (PCP) Center for Curriculum Development, Research, and Evaluation. The manual will include relevant sections of this project report, plus specific teaching activities from Kendall and Clinite. It will become part of PCP's regular product line and distributed through PCP's catalogues and the Gallaudet University bookstore, which carries the full line of products.

Outreach Services, one of the components of PreCollege Programs, is responsible for disseminating information to programs for deaf and hard of hearing students nationwide, and publishes three periodicals, which will be key mechanisms for dissemination of information about this project: Perspectives in Education and Deafness, a professional journal published five times a year; The World Around You, a newsletter for high school students; and The American Annals of the Deaf, a refereed research journal published five times a year. PCP also manages Network News, a newsletter that links mainstream programs serving deaf students.

Outreach Services is also responsible for coordinating and conducting ENFI training and technical assistance for other programs requesting it.

REFERENCES

Beil, D. (1989). Teacher's guide to using computer networks for written interaction. Washington, DC: Realtime Learning Systems.

Bonk, C.J. (1990). A synthesis of social cognition and writing research. Written Communication, 7(1), 136-163.

Bouvet, D. (1990). The path to language: Bilingual education for deaf children. Clevedon, Avon, England: Multilingual Matters.

Bruner, J.S. (1975). The ontogenesis of speech acts. Journal of Child Language, 2, 1-40.

Bruner, J.S. (1990). Acts of meaning. Cambridge, MA: Harvard University Press.

Cazden, C. (1981). Adult assistance to language development: Scaffolds, models and direct instruction. In R.P. Parker & F. Davis (Eds.), Developing literacy. Newark, DE: International Reading Association.

Clarke, M.A. (1987). Don't blame the system: Constraints on "whole language." Language Arts, 64(4), 384-395.

Cokely, D. (1979). Pre-College Programs guidelines for manual communication. Washington, DC: Pre-College Programs, Gallaudet College.

French, M.M., Hallau, M.G., & Ewoldt, C. (1985). Language arts curriculum guide: Kendall Demonstration Elementary School. Second Edition. Washington, DC: PreCollege Programs, Gallaudet University.

Goodman, K. (1986). What's whole in whole language. Portsmouth, NH: Heinemann.

Halliday, M.A.K. (1975). Learning how to mean: Explorations in the development of language. NY: Elsevier North-Holland.

Harste, J.C., Burke, C.L., & Woodward, V. (1982). Children, their language and world: Initial encounters with print. NIE Final Report No. G-19-0132. (ERIC Document Reproduction Service)

Hornberger, N.H. (1989). Continua of biliteracy. Review of Educational Research, 59(3), 271-296.

Lehr, F. (1985). ERIC/RCS report: Instructional scaffolding. Language Arts, 62, 667-672.

Oxley, P. (1988). What is whole language? Whole Language Special Interest Group of the International Reading Association, 2(1).

Peyton, J.K., & Batson, T. (1986). Computer networking: Making connections between speech and writing. ERIC/CLL News Bulletin, 10(1), 1-7.

Peyton, J.K., & Mackinson, J. (1989). Writing and talking about writing: Computer networks with elementary students. In D. Roen & D.M. Johnson (Eds.), Richness in writing: Empowering minority students (pp. 100-119). New York: Longman.

Smith, F. (1985). Reading without nonsense. NY: Teachers College Press.

Sowers, S. (1982). Writing development in context: The Atkinson Study. Unpublished manuscript cited in Farr, M. (1983). Writing growth in young children: What we are learning from research. Washington, DC: Dingle Associates, Inc. (ERIC Document Reproduction Service No. ED 233 389)

Teale, W.H. (1982). Toward a theory of how children learn to read and write naturally. Language Arts, 59, 555-570.

Vygotsky, L.S. (1962). (Edited and translated by E. Hanfmann & G. Vakar). Thought and language. Cambridge, MA: MIT Press.